LWG
LOWER WILLAMETTE GROUP

PORTLAND HARBOR RI/FS

DRAFT
ROUND 3A FIELD SAMPLING PLAN ADDENDUM
STORMWATER SAMPLING

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This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part

RECOMMENDED FOR INCLUSION IN ADMINISTRATIVE RECORD

November 2, 2007

Prepared for:
The Lower Willamette Group

Prepared by:
Anchor Environmental, L.L.C.

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1.0 INTRODUCTION

This Field Sampling Plan (FSP) Addendum presents the approach and procedures to implement additional stormwater sampling activities in late 2007 for the Remedial Investigation and Feasibility Study (RI/FS) of the Portland Harbor Superfund Site (Site). This FSP Addendum is provided as a supplement to the Round 3A Stormwater Sampling – FSP (Anchor and Integral 2007a) and the Round 2 Quality Assurance Project Plan (QAPP) Addendum 8 (Integral 2007). The FSP and QAPP provided procedures to implement stormwater sampling activities in spring 2007 and was developed by the Stormwater Technical Team consisting of U.S. Environmental Protection Agency (EPA), Oregon Department of Environmental Quality (DEQ), and the Lower Willamette Group (LWG). The spring sampling resulted in less than the total number of desired samples, as described in the FSP, being collected at some sites. The Stormwater Technical Team reviewed this completeness information and determined that several substantial data needs existed to ensure that the stormwater data set was sufficient to meet the originally intended FSP objectives. This addendum describes the methods for collection of those additional data needs in late 2007.

This sampling will be conducted following the methods described in the FSP. Only the variations to the FSP methods specific to this late 2007 sampling are presented in this Addendum. The following information is contained in this FSP Addendum:

- **Sample Location, Types, and Numbers (Supplements FSP Section 2.0) –** Discussion of where supplemental sampling will occur starting in November 2007.
- **Sample Collection and Processing Procedures (Supplements FSP Section 3.0) –** Discussion of variations in these procedures from the FSP.

2.0 SAMPLE LOCATION, TYPES, AND NUMBERS

Section 2.0 of the FSP describes the sample locations, types, and numbers for sampling in spring 2007. Variations from the approach detailed in the FSP are discussed below.

The sampling stations that changed from the FSP, per direction of the Stormwater Technical Team and approved by EPA, include WR-123, WR-384, and WR-142, as described below.

- Schnitzer International Slip - The FSP indicated that WR-121 or WR-123 would be sampled because the actual location had not been selected at that time. WR-123 was selected by the Stormwater Technical Team.
- Schnitzer Riverside - The FSP indicated that WR-108 would be sampled. Reconnaissance of the site resulted in the Stormwater Technical Team changing the location to WR-384.
- Gunderson - The FSP indicated sampling at WR-145. Due to a barge being placed over the outfall, the location was changed to WR-142 on May 1, 2007 per agreement with the Stormwater Technical Team.
- Sulzer – The FSP indicated that WR-4 would be sampled. However, during preparation of the spring Field Sampling Report (FSR),, it was discovered that a different outfall was sampled. For the purposes of this FSP, the outfall sampled in spring will be called "Old WR-4" since the outfall name has not been definitively determined at this time.

The attached Table 2-1 and Figure 2-1(a-c) summarize the sample locations, types, and numbers for sampling to be conducted starting in November 2007 per the determinations of EPA and the Stormwater Technical Team.

2.1 STORMWATER COMPOSITE SAMPLES

Flow-weighted composite samples will be collected at a total of nine sites, including one new site (Hwy 30 at Reed Street) not discussed in the FSP. The number of composite samples required at each site is shown in Table 2-1.

The Hwy 30 B at Reed Street location is representative of major transportation land use. The exact location of this sampling has not yet been determined through field reconnaissance and therefore is not shown on Figure 2-1. Data from this location will supplement data from the St. John's Bridge location that was previously sampled in accordance with the FSP. The St. John's Bridge location was deemed by the Stormwater Technical Team and determined by the EPA as potentially unrepresentative of the major

transportation land use based on the bridge reconstruction work completed in the fall of 2005. The Stormwater Technical Team recommended that data from an alternate major transportation land use location be collected in the event that thorough appraisal of the St. John's Bridge data concludes that some or all of the results are unrepresentative, and therefore, unusable for estimating generalized land-use stormwater loads.

Also, the original Highway 30 site is being resampled due to the fact that there was influence from some non-road drainage at the originally sampled location. The position of the sampling tube will be placed just upstream of the pipe draining the non-road areas to obtain a more accurate sample of road-only stormwater runoff for this late 2007 sampling.

At Sulzer, three composite samples will be collected at the actual WR-4 outfall location (also known as "New WR-4"), due to the fact that this outfall was not sampled in the spring as intended. Note that the ability to sample WR-4 is subject to confirmation via field reconnaissance that it is feasible to do so. No additional samples will be collected at the "old WR-4" location.

The rationale for other stormwater sampling stations is generally to collect additional storm events where less than the target three storm events were obtained for all analytes in the original spring 2007 sampling. However, not every station with less than three storm events is being sampled in late 2007. The stations shown in Table 2-1 are generally those that were judged by members of the Stormwater Technical Team, including EPA, to represent data gaps with regards to data objectives of the original FSP.

2.2 SEDIMENT TRAP SAMPLES

Sediment trap samples will be collected at 13 sites, including one new site (Hwy 30 at Reed Street) as discussed above. The rationale for sampling the two transportation sites is the same as provided above. The general rationale for the remainder of the sediment traps sites is that insufficient sediment was collected at these sites in spring 2007 to conduct all FSP required chemical analyses. Consequently, additional sediment sampling is needed, particularly at key locations that represent major data gaps (as judged by the Stormwater Technical Team including EPA) with regards to the calculation of stormwater loads per the objectives of the original FSP.

As noted above for stormwater, sediment sampling at Sulzer will be at the actual WR-4, which was the original intent of the FSP. Sediment traps will be deployed at the actual WR-4 outfall location if field reconnaissance shows it is feasible.

The sediment traps will be deployed at each location for a minimum target period of 2 months during the wet-weather period. In order to allow for more sediment accumulation, multiple sediment traps will be deployed in some locations as space allows. Additionally, weirs or temporary basins to pond water may be used in order to get more sediment accumulation. The sediment trap deployment may be extended longer

than two months if 1) sufficient volumes have not been collected, 2) the extension is likely to generate the sample volume needed to conduct selected analyses, and 3) extending the sampling schedule will not adversely impact the schedule for RI development.

2.3 FLOW MEASUREMENTS

Isco Model 750 Area Velocity flow modules will be used at stormwater sampling sites in conjunction with the Isco automatic samplers to allow the collection of flow-weighted composites at each sampling location. At sites where no composite samples are required, flow will not be measured.

3.0 SAMPLE COLLECTION AND PROCESSING PROCEDURES

Section 3.0 of the FSP describes the sampling procedures, record keeping, sample handling, storage, and field quality control procedures that will be used during stormwater and sediment sampling. Variations from the approach detailed in the FSP are discussed below.

3.1 EQUIPMENT DECONTAMINATION PROCEDURES

An equipment decontamination procedure that is alternate to the FSP procedure has been developed for the composite sampling equipment. The FSP indicated that decontamination of most equipment would likely take place at the LWG Field Laboratory. However, due to the large quantity of ISCO collection vessels and composite glass carboys, Columbia Analytical Systems (CAS) laboratories will carry out the decontamination of these containers. Other items will be decontaminated as needed at the LWG Field Laboratory following the alternate procedure. In this procedure 20 percent hydrochloric acid (HCl) rinse in the FSP procedure will be replaced with 10 percent nitric acid. Collection vessels will be delivered to the LWG Field Laboratory in cardboard boxes and stored as such until needed.

The alternate decontamination procedure for ISCO glass collection vessels, 20-L glass carboys, and coated stir bars will be:

- Wash with soapy water and rinse with tap water
- Rinse with reagent-grade acetone
- Rinse with 10 percent nitric acid (HNO3)
- Rinse three times with deionized water
- Allow to dry
- Cap container with Teflon lined ISCO lids (collection vessels) or aluminum foil (glass carboys)
- Store in cardboard boxes provided (ISCO collection vessels)
- Wrap clean carboys in polyethylene bag and seal
- Store clean stir bars in decontaminated glass jar

The alternate decontamination procedure for Teflon® suction lines and silicon pump head and distributor arm tubing will be:

- Thoroughly pump through Liquinox® wash followed by CAS deionized water rinse

The alternate decontamination procedure for ISCO samplers will be:

- Thoroughly wash with Liquinox® water followed by CAS deionized water rinse

The equipment for sediment processing will be decontaminated between each sample location in the following manner:

- Glass and stainless steel equipment – wash with soapy (Liquinox®) water and rinse with tap water, rinse with acetone, rinse with CAS deionized water, rinse with 10 percent nitric, and rinse three times with CAS deionized water.
- Acrylic filter stand and peristaltic pump tubing – wash (or pump) soapy (Liquinox) water, rinse with tap water, and rinse three times with CAS deionized water.

3.2 COMPOSITE STORMWATER SAMPLING METHODS

Initially during sampling in spring 2007, the ISCO automated samplers were programmed to collect a flow proportional sample at regular time intervals as described in the FSP. During a testing event before most of the automated samplers were deployed, it was found that the automated sampler did not collect the samples as anticipated based on the technical manual and discussions with the vendor. After several communications with TeleDyne ISCO technical support, it was found that the samplers could not operate in the mode desired with a multiple bottle set up and could only function in the desired mode with a single sample collection jar. Consequently, the automated samplers were reprogrammed and samples were collected on an irregular time basis with the frequency of aliquot collection is based on the volume of water that has passed the flow meter since the previous aliquot collection. The automated sampler collected the stormwater in 180-ml increments or ten aliquots per sample jar. The frequency of sampling was dependent on the flow rate and the sampler programming that was unique to each sampling site. As the basin runoff characteristics were better defined, the programming was similarly refined.

During the course of the spring 2007 sampling, it became necessary to change sampling strategy at some sites. This second sampling strategy is termed “time-based” sampling. With time-based sampling it is not necessary to make a prediction of the volume of runoff expected to be generated by various storms. The strategy was primarily used at sites where it was difficult to predict and/or measure stormwater flows. Reasons for this included:

- For initial sampling events at some sites, there was very little or no antecedent flow record with which to help choose a flow-based sampling program.

- For some sites, the area-velocity meter could not accurately measure the velocity of the shallow water in the pipes (primarily at large infrastructure sites with shallow water during the flow conditions of the sampling period).
- For the last sampling event, there was very little or no antecedent flow record to predict flows after a long dry period with less base flow and more tree cover.

During sampling starting in November 2007, the sampling scheme will be flow-based as described above whenever possible. However, the sampling will be changed to a time-based system in which the sampler collects aliquots on a uniform time basis after an initial "trigger" based on either increased flow or water level if necessary due to the similar situations as described above.

During the compositing process, sample bottles will manually weighted for flow-based sampling using either cumulative flow or water level measurements depending on the availability of reliable data. To find the contribution of each sample bottle, relative cumulative flow is the preferred parameter, with relative cumulative water level used if flow data is not reliable.

3.3 COMPOSITE SAMPLE FIELD PARAMETER MEASUREMENTS

The FSP stated that water quality parameters for stormwater outfall samples would be measured in the field. Given that there is considerable variation in visible water quality across the bottles in a particular sampler, and that it will not be known at that time which bottles would eventually be included in the composite sample, it has been determined that measurement of field parameters prior to compositing would likely be non-representative of the eventual composite sample. Instead, individual stormwater sample containers will be brought back from the field, composited in 20 L glass carboys, and the water quality parameters measured from the sample composites. Depending on the final composite volume, an aliquot of sample (approximately 100 to 200 mL) will be either:

- Removed immediately for measurements of water quality parameters, or
- In cases of very limited composite volume, the aliquot will collected immediately after filling the priority sample containers for chemical analyses.

3.4 COLLECTION OF COMPOSITE SAMPLES FOR PHTHALATE ANALYSIS

Phthalate samples will not be mixed manually with stainless steel rod as listed in FSP. Samples for phthalates analysis will be collected in identical fashion to all other organic constituents, which generally avoids any phthalate containing materials. All sample handling will be done wearing phthalate-free nitrile gloves.

3.5 EQUIPMENT RINSATES AND TEMPERATURE BLANKS

The FSP only requires a single equipment rinsate blank prior to deployment of the ISCO samplers. To provide additional information about the decontamination procedures and identify possible contamination sources throughout the entire sample collection and compositing sequence, the following additional equipment and/or rinsate blanks will be created and analyzed as discussed in Section 4.9 of the FSP:

- Sediment trap bottle rinsate blank
- ISCO tubing, sampling arm, and bottles rinsate blank
- Stormwater composite equipment rinsate blank

In each case, all rinsate blank samples will be treated identically to any other water sample described in the FSP and QAPP Addendum in terms of storage, transport, analyses, and laboratory QA/QC procedures.

3.6 SEDIMENT TRAP COLLECTION AND PROCESSING

Samples will be processed in the following manner, which differs slightly from the FSP description:

- For each station, a 16-ounce glass jar will be labeled with the appropriate sample identification information.
- Using a decontaminated acrylic filter stand apparatus, glass flask, peristaltic pump and tubing, stainless steel spatula, and 6 micron cellulose filters, the entire contents of each of the sediment bottles will be filtered.
- Once most of the water will be decanted from the sediment trap bottle, the remaining sediment will then transferred directly to the sample jar.
- A stainless-steel spatula will be used to scrape the remaining material off the filter and into the sample jar.

4.0 REFERENCES

Anchor Environmental and Integral. March 1, 2007a. Round 3A Upland Stormwater Sampling – Field Sampling Plan (FSP). Prepared for the Lower Willamette Group, Portland, OR. Anchor Environmental, Seattle, WA.

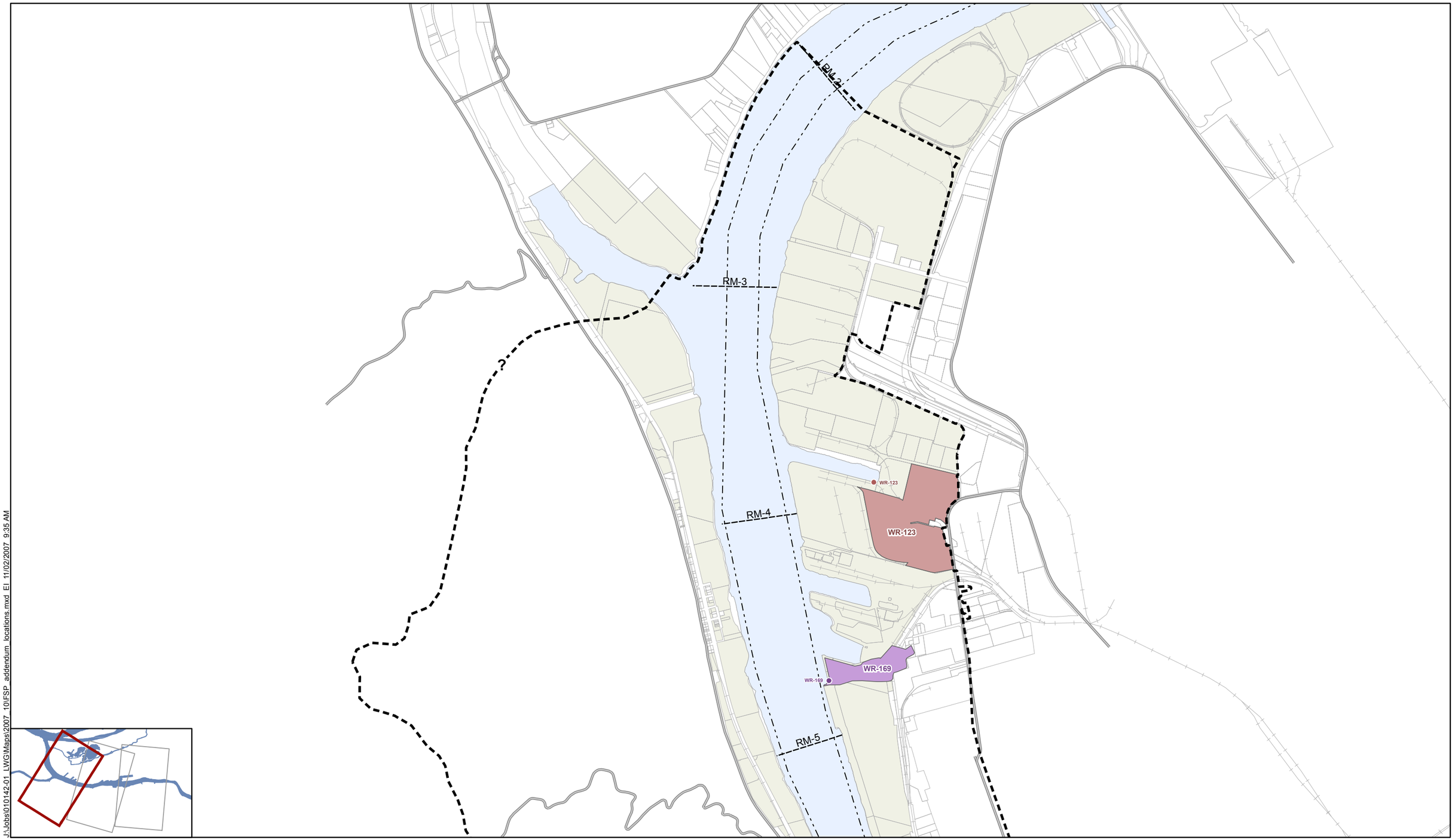
Integral. March 1, 2007. Round 2 Quality Assurance Project Plan Addendum 8: Round 3a Stormwater Sampling. Prepared for the Lower Willamette Group, Portland, OR. Anchor Environmental, Seattle, WA.

Table

Table 2-1. Proposed Stormwater Sampling Locations.

Outfall(s)	Facility or Location	River Mile	Land Use	Composite Sample Storm Events	Sediment Trap Required
Industrial Locations (7)					
WR-123	Schnitzer International Slip	3.7	Heavy Industrial	--	YES
WR-96	Arkema	7.3	Heavy Industrial	1	YES
WR-14	Chevron - Transportation	7.7	Heavy Industrial	--	YES
WR-161	Portland Shipyard	8.2	Heavy Industrial	--	YES
WR-4	Sulzer Pump	10.4	Heavy Industrial	3	YES
WR-142	Gunderson	8.9	Heavy Industrial	2	YES
WR-147	Gunderson (former Schnitzer)	9	Heavy Industrial	--	YES
Land Use Locations (6)					
Hwy 30	Hwy 30	9.7	Major Transportation	3	YES
Hwy 30 "B"	Hwy 30	TBD	Major Transportation	3	YES
OF-49	City - St. Johns Area	6.5	Residential	1	YES
OF-22C, above Hwy 30	City - Forest Park Area	6.9	Open Space (Forest Park)	1	NO
OF-22B	City - Doane Lake Industrial Area	6.9	Heavy Industrial	1	YES
WR-218	UPRR Albina	10	Heavy Industrial	1	YES
Multiple Land Use Locations (1)					
OF-18	City - Multiple Land Uses	9.7	Open Space/Heavy Industrial	--	YES
Terminal 4- Recontamination Evaluation (1)					
WR-169/Basin D	Terminal 4 (Toyota)	4.7	Light Industrial	3	YES

Figure



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ANCHOR ENVIRONMENTAL, L.L.C.

LWG LOWER WILLAMETTE GROUP

N

0 500 1,000 1,500 2,000 Feet

Map Features:

Proposed Stormwater Sampling Locations
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

Outfall Drainage basins
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

- Approx. Drainage Boundary
- Navigation Channel
- Waterfront Taxlots
- Waterfront Ownership
- River miles

NOTE:
The old WR-4 outfall was sampled in spring. The new WR-4 outfall will be sampled for the scope of work described in this FSP addendum. However, this basin is not shown on this figure because the basin has not been determined at this time. This basin delineation for this outfall will be included in the Field Sampling Report after sampling is completed.

FEATURE SOURCES:
Land Use/Zoning, Streams, Water Bodies: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Figure 2-1a
FSP Addendum
Sampling Locations
River Mile 02 to 05

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RM-5

RM-6

RM-7

RM-8

OF49

OF22C

OF22B

WR-96

WR-14

WR-161

ANCHOR ENVIRONMENTAL, L.L.C.

LWG LOWER WILLAMETTE GROUP

0 500 1,000 1,500 2,000 Feet

Map Features:

Proposed Stormwater Sampling Locations
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

Outfall Drainage basins
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

- Approx. Drainage Boundary
- Navigation Channel
- Waterfront Taxlots
- Waterfront Ownership
- River miles

NOTE:
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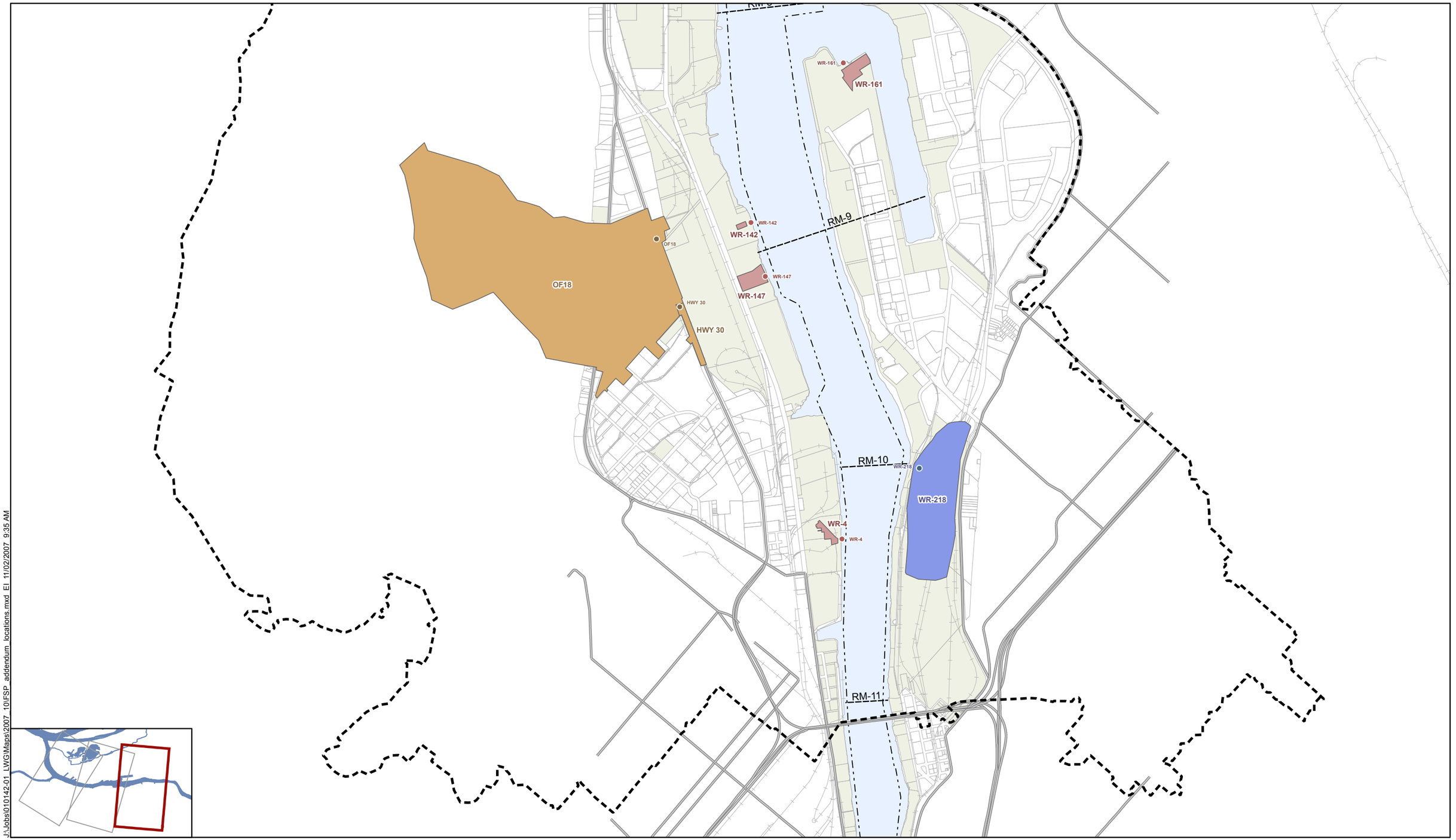
FEATURE SOURCES:
Land Use/Zoning, Streams, Water Bodies: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Figure 2-1b
FSP Addendum
Sampling Locations
River Mile 05 to 08



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ANCHOR ENVIRONMENTAL, L.L.C.

LWG LOWER WILLAMETTE GROUP

0 500 1,000 1,500 2,000 Feet

Map Features:

Proposed Stormwater Sampling Locations
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

Outfall Drainage basins
- Heavy Industrial - Land Use Category
- Heavy Industrial - Site Specific
- Light Industrial
- Multiple Land Uses
- Residential
- Open Space

- Approx. Drainage Boundary
- Navigation Channel
- Waterfront Taxlots
- Waterfront Ownership
- River miles

NOTE:
The old WR-4 outfall was sampled in spring. The new WR-4 outfall will be sampled for the scope of work described in this FSP addendum. However, this basin is not shown on this figure because the basin has not been determined at this time. This basin delineation for this outfall will be included in the Field Sampling Report after sampling is completed.

FEATURE SOURCES:
Land Use/Zoning, Streams, Water Bodies: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Figure 2-1c
FSP Addendum
Sampling Locations
River Mile 08 to 11

APPENDIX A

EPA-LWG COMMUNICATIONS

Contents of E-mail Discussions

August 14, 2007 Stormwater Technical Team Call Highlights (Aug.13th call)

From: Koch.Kristine@epamail.epa.gov
Sent: Tue 8/14/2007 2:52 PM
To: Scheffler, Linda
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Carl Stivers; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

All - here are my thoughts.

I think that it is more important to get the pesticide data rather than the phthalate data. Where any data for any parameter is insufficient, then it should be considered for additional data needs in the 8/23 meeting.

Kristine Koch
Remedial Project Manager
USEPA, Office of Environmental Cleanup
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(206)553-6705
(206)553-0124 (fax)
1-800-424-4372 extension 6705 (M-F, 8-4 Pacific Time, only)

"Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US> 08/14/2007 12:46 PM

To 'Carl Stivers' <cstivers@anchorenv.com>, Amanda Shellenberger <ashellenberger@anchorenv.com>, Amanda Spencer <aspencer@ashcreekassociates.com>, "Sanders, Dawn" <DAWNS@BES.CI.PORTLAND.OR.US>, Jim McKenna <Jim.McKenna@portofportland.com>, "Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US>, TARNOW Karen E <TARNOW.Karen@deq.state.or.us>, Andy Koulermos <akoulermos@newfields.com>, Laura Jones <ljones@integral-corp.com>, Kristine Koch/R10/USEPA/US@EPA, "LaFranchise, Nicole"

<Nicole.LaFranchise@portofportland.com>

cc

Jim McKenna <Jim.McKenna@portofportland.com>, Jessica Pisano <jpisano@anchorenv.com>, Christine Hawley <chawley@integral-corp.com>, Gene Revelas <grevelas@integral-corp.com>, Bob Wyatt <rjw@nwnatural.com>, "Applegate, Rick" <RICKA@BES.CI.PORTLAND.OR.US>

Subject

RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

Team,
After we left our call, Dawn and I realized an additional consideration that should have been discussed as part of the reprioritization between organochlorine pesticides and PAHs/phthalates. Pesticides and phthalates were the two analytical groups that were not slated for analysis in all stormwater composites because 1)pesticides were not likely to be detected in stormwater at concentrations that may be significant and 2)there was a high likelihood that phthalate results could be qualified by field or lab contamination of samples. We discussed relying more heavily on the sediment trap samples to evaluate these parameters.

With the proposed shifts, we may be sacrificing phthalate data for pesticides. Are we comfortable with the remaining data set for phthalates?

From: Carl Stivers [mailto:cstivers@anchorenv.com]
Sent: Tuesday, August 14, 2007 11:37 AM
To: Carl Stivers; Amanda Shellenberger; Amanda Spencer; Dawn Sanders; Jim McKenna; Scheffler, Linda; TARNOW Karen E; Andy Koulermos; Laura Jones; Koch.Kristine@epamail.epa.gov; LaFranchise, Nicole
Cc: Jim McKenna; Jessica Pisano; Christine Hawley; Gene Revelas; Bob Wyatt; Rick Applegate
Subject: Stormwater Technical Team Call Highlights (Aug. 13th call)

Stormwater Technical Team -

The Stormwater Technical Team (EPA/DEQ/LWG) discussed LWG's proposed approach for handling stormwater sediment trap samples yesterday. Here the meeting highlights and action items. As always, please let me know if I missed something. It was agreed that the next call would be on August 23 at 1 pm. The technical team agreed to the LWG proposed approach for sediment trap analyses including the following specific points:

Reduce the mass of sample used for TOC analysis (from 1 gram to

0.1 grams), to provide more mass for chemical analyses
Use catch basin sediments collected from select locations for field and laboratory QA/QC analyses

In addition, the technical team agreed to the following changes in the LWG proposed analysis prioritization approach:

Use sample mass proposed for PAH/phthalates analyses for organochlorine analyses instead at stations WR-123 (Schnitzer Slip), WR-14 (Chevron Transportation), WR-161 (Portland Shipyard), WR-147/148 (Gunderson)
Use sample mass proposed for PCB analyses for organochlorine analyses instead at station OF-49 (City - St. Johns Area)

(Note that the LWG needs to obtain formal Exec. committee approval for these changes. We will notify the stormwater tech. team if LWG Exec.
cannot approve these changes for some reason.)

It was also agreed that the next call would discuss the sample completion information and whether it meets the original FSP objectives and to what extent this indicates a need for additional fall sampling.
To prepare for this discussion, the LWG agreed to obtain sample completion information on the T-4 stormwater stations from the Port and on the GE site stormwater sampling from DEQ. In addition, the LWG intends to summarize the percent detects for the Batch 2 and 3 stormwater composite data and, if possible in time, have this available for the next call as well.

It was also agreed that at the next call the group would start to talk about methods for calculating stormwater loads based on the program data.

Thanks.

Carl

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From: Carl Stivers
Sent: Monday, August 13, 2007 8:50 AM
To: Amanda Shellenberger; 'Amanda Spencer'; 'Dawn Sanders'; Jim McKenna; 'Scheffler, Linda'; 'TARNOW Karen E'; 'Andy Koulermos'; 'Laura Jones'; 'Koch.Kristine@epamail.epa.gov'; 'LaFranchise, Nicole'
Subject: RE: Stormwater Sediment Trap Sample Handling and Analysis Methods

Stormwater Tech Team -

The text below was also supposed to be provided to you with the two execl tables that were sent around previously. Again, my apologies for not getting this to you sooner. I will go over the contents of the text at the start of the call at 9 am (in a few minutes).

The sediment trap samples are summarized on the spreadsheet titled "Stormwater Outfall Sed Trap Sample Mass Analytical Aliquots" prepared by the LWG. It includes wet weight, percent solids, dry weight, and a potential scheme for analysis for each sediment trap sample and the catch basin sediments. Since the sample mass was limited from the sediment trap stations, catch basin sediments at some locations were collected for potential use as laboratory quality control samples (e.g.
matrix spike/matrix spike duplicate samples for organics and matrix spike/laboratory duplicate samples for metals and TOC, TSS) and field quality control samples (field duplicates). The approach detailed in the sediment trap spreadsheet includes the use of the catch basin sediments as field and lab QC samples as an option for discussion with the Stormwater Technical Team.

Two relevant issues that developed during analysis are summarized below:

> The two laboratories [CAS and Vista (formerly Alta)] that will be conducting the analyses were contacted to confirm receipt of upcoming samples and discuss the approach. Both laboratories indicated that to meet our low detection limits the minimum sample weights required for analysis for organic parameter groups were dry weight aliquots. This is not consistent with previous discussions with these labs or the information in the FSP and QAPP. The attached spreadsheet assumes the minimum sample masses for PCB congeners, organochlorine pesticides, PAHs/phthalates, metals, and herbicides in dry weight.
>
> When conducting the total solid analysis, CAS did not use the minimum sample mass (1g) for most samples. CAS was notified about the limited sediment available from the sediment trap samples and was requested to use the minimum sample mass; however, the analyst who weighed the samples for the analysis consumed more than the minimum sample mass for most samples. The attached spreadsheet includes the actual weights used for total solids measurements.

Two separate schemes were developed in the Analytical Aliquot spreadsheet. The first scheme details sample aliquots for each individual sample as a stand-only sample (i.e., field replicate samples are considered to be a different sample than its parent sample) and the second scheme details sample aliquots where field replicate samples are combined with their parent samples as one stand-alone sample to help increase available sample mass for analysis. Combining the field replicates is currently our recommended approach in concert with obtaining field and lab QC from catch basin sediment samples as noted above.

Both schemes were developed by calculating the dry weight from the percent solids measurements, subtracting out the actual wet weight mass used for the percent solids, TOC, and metals (if applicable) measurements, and calculating other aliquots for analysis. The aliquots were assigned in this spreadsheet based solely on the priority of analytes from the FSP. There are numerous options for each sample for distribution of sample mass for analysis. This spreadsheet was developed for use by the stormwater tech team for discussion purposes to determine the approach for each sample. Obviously, the approach could vary sample by sample by reducing the sample size one of the analysis and consuming the remaining sample for another parameter group (e.g.
reduce sample mass extracted for PAHs/phthalates to provide sample mass for metals analysis (3.5 g for metals will result in 2X DL). Also, note that while organics are extracted on a dry weight basis as noted above, metals will be extracted on a wet weight basis. A minimum of 7g wet weight is necessary for this analysis to meet project MRLs. Sample aliquots in the table show wet/dry mass needed for metals analysis (based on a sample's total solids content); dry weights were used for ease of calculation to determine sample mass remaining for analysis. Also, a procedural recommendation is that all of the remaining analytical aliquots will be created at one time so we know the sample is well homogenized and any issues with discrepancies in the amount of total sample (although we expect such discrepancies will be small) can be resolved then before the samples are extracted.

The second spreadsheet titled "Stormwater Summary," details each sample's expected sediment detection limit factor; the level of detection will be elevated by the number presented in each cell based on limited sample volume. For example, a value of 1 means the target DL will be met and a value of 2 means the actual achieved DL will be two times higher than the target DL. We have layered on top of this spreadsheet a color coding reflects the percentage of time each analyte group was detected at that station for the Batch 1 stormwater data.
While Batch 1 results do not provide an indication of detection frequency for the entire stormwater data set and some stations were not sampled in Batch 1, it is the currently available data set with which we can start to understand the frequency of detections in stormwater. The summary table is intended to help determine where we have or are likely to have data from either sediment traps and/or stormwater samples. For example, the table shows where we have a complete absence of information (no detection limit factor for sediments and no coloring for stormwater), a limited amount of data (large detection limit factor sediments and light coloring for stormwater), and where we have an analyte group that is likely covered by both sampling methods (small detection limit factor for sediments and dark coloring for stormwater).

The Stormwater Technical Team asked for the LWG to propose a method for sediment trap sample handling. In summary, per the above discussion, we are proposing to recommend to EPA/DEQ members of the Stormwater Technical Team the following:

Follow the priority order of analyses as previously agreed upon

and detailed for each station in the EPA approved Stormwater FSP
Combine field replicate samples into one samples available at some locations to achieve a higher sediment volume for analysis and to obtain data no more analyte groups at these locations
Use catch basin sediments collected at the locations noted in the detailed spreadsheet for field and laboratory QC

PCBs appear to be the most important chemical from an in-river risk perspective. This approach will allow us to obtain PCB data for the majority of sampling locations (sometimes at elevated DLs), which is likely to be supported by a substantial body of detected data in stormwater samples. The approach will also allow us to obtain PAH/Phthalate and Organochlorine pesticide data for those sites where these are the next highest priority analyte. (Note the sequence of the second/third priority analytes varies across the sample locations.) Across all sites, limited data will be obtained on third priority and higher analytes.

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From: Amanda Shellenberger
Sent: Wednesday, July 25, 2007 3:45 PM
To: 'Amanda Spencer'; 'Dawn Sanders'; 'Jim McKenna'; 'Scheffler, Linda'; 'TARNOW Karen E'; Carl Stivers; 'Andy Koulermos'; 'Laura Jones'; 'Koch.Kristine@epamail.epa.gov'; 'LaFranchise, Nicole'
Subject: Stormwater Sediment Trap Sample Handling and Analysis Methods

Stormwater Tech Team -

Good News! The Stormwater Sediment Trap Sample Handling and Analysis Methods were APPROVED with no changes by the Exec. Committee today.

I've attached the two files for your review. Let's set up a conference call to discuss. Please email me with your potential availability. The best times for Carl and me are August 6th, 8th, or 9th anytime.

Amanda Shellenberger, P.E.
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Fax: (206)287-9131

August 20, 2007 Stormwater Technical Team Call Highlights (Aug.13th call)

From: Scheffler, Linda [LindaSC@BES.CI.PORTLAND.OR.US]
Sent: Mon 8/20/2007 4:32 PM
To: 'Laura Jones'; Carl Stivers; Koch.Kristine@epamail.epa.gov; Scheffler, Linda
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

In our tech call we discussed including the GE and Port monitoring locations in the data summary tables. I just received a copy of the GE April 2007 Stormwater Monitoring Report prepared by AMEC. The AMEC representative informed me that two storms have been sampled at the site to date. This report represents the first event, during which samples were collected only from the north yard sampling location, as flow volume wasn't sufficient to sample from the south yard. For the second event, equipment at the north yard location failed, and samples were collected only from the south yard sampling location. Data for the second event is just starting to come in.

GE intends to collect 3 more storm events at both locations this fall.

-----Original Message-----
From: Laura Jones [mailto:ljones@integral-corp.com]
Sent: Friday, August 17, 2007 10:23 AM
To: Carl Stivers; Koch.Kristine@epamail.epa.gov; Scheffler, Linda
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

Hi - In response to Carl's question, I have requested a query of the database for all stormwater events to answer the question about the frequency of detects of phthalates in laboratory and field blanks. I expect to receive the query late today and will send an e-mail to this group on Monday or Tuesday.

Laura

Laura L. Jones
Managing Scientist
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ljones@integral-corp.com
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mail message unless you are the intended recipient. If you have received this message in error, please delete all copies and notify the sender immediately at ljones@integral-corp.com. Thank you .
-----Original Message-----
From: Carl Stivers [mailto:cstivers@anchorenv.com]
Sent: Thursday, August 16, 2007 1:56 PM
To: Koch.Kristine@epamail.epa.gov; Scheffler, Linda
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

Stormwater Technical Team -

I was hoping others could weigh in on this issue raised by the City and see where we stand. If we cannot resolve this additional change via email, it will have to wait until our next call on August 23rd, because that was our collective next available time to all meet to discuss anything.

I'd like to avoid waiting that long if possible, so any feed back you can give via email would be most appreciated. So far we have heard from Kristine.

My take on this issue is that we conducted phthalate stormwater sampling at
11 stations (more than the 2 stations for pesticides). I looked at the detect rates for phthalates in the Batch 1 stormwater data, and phthalate detection rates were generally above 50% at these stations with a few exceptions. Assuming that these are truly detections and not blank contamination, it seems like we would be filling more data gaps for pesticides than we would be creating for phthalates by making the changes that we agreed to at the conclusion of the last call.

Laura - Do you know whether we got a lot of stormwater field or lab blank contamination for phthalates? That would be a good way of checking whether the high level of phthalate stormwater detects are suspect.

Thanks.

Carl

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-----Original Message-----
From: Koch.Kristine@epamail.epa.gov [mailto:Koch.Kristine@epamail.epa.gov]
Sent: Tuesday, August 14, 2007 2:52 PM
To: Scheffler, Linda
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Carl Stivers; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

All - here are my thoughts.

I think that it is more important to get the pesticide data rather than the phthalate data. Where any data for any parameter is insufficient, then it should be considered for additional data needs in the 8/23 meeting.

Kristine Koch
Remedial Project Manager
USEPA, Office of Environmental Cleanup
1200 Sixth Avenue, M/S ECL-115
Seattle, WA 98101
(206)553-6705
(206)553-0124 (fax)
1-800-424-4372 extension 6705 (M-F, 8-4 Pacific Time, only)

"Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US> 08/14/2007 12:46 PM

To 'Carl Stivers' <cstivers@anchorenv.com>, Amanda Shellenberger <ashellenberger@anchorenv.com>, Amanda Spencer <aspencer@ashcreekassociates.com>, "Sanders, Dawn" <DAWNS@BES.CI.PORTLAND.OR.US>, Jim McKenna <Jim.McKenna@portofportland.com>, "Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US>, TARNOW Karen E

<TARNOW.Karen@deq.state.or.us>, Andy Koulermos <akoulermos@newfields.com>, Laura Jones <ljones@integral-corp.com>, Kristine Koch/R10/USEPA/US@EPA, "LaFranchise, Nicole" <Nicole.LaFranchise@portofportland.com>

cc

Jim McKenna <Jim.McKenna@portofportland.com>, Jessica Pisano <jpisano@anchorenv.com>, Christine Hawley <chawley@integral-corp.com>, Gene Revelas <grevelas@integral-corp.com>, Bob Wyatt <rjw@nwnatural.com>, "Applegate, Rick" <RICKA@BES.CI.PORTLAND.OR.US>

Subject

RE: Stormwater Technical Team Call Highlights (Aug. 13th call)

Team,
After we left our call, Dawn and I realized an additional consideration that should have been discussed as part of the reprioritization between organochlorine pesticides and PAHs/phthalates. Pesticides and phthalates were the two analytical groups that were not slated for analysis in all stormwater composites because 1)pesticides were not likely to be detected in stormwater at concentrations that may be significant and 2)there was a high likelihood that phthalate results could be qualified by field or lab contamination of samples. We discussed relying more heavily on the sediment trap samples to evaluate these parameters.

With the proposed shifts, we may be sacrificing phthalate data for pesticides. Are we comfortable with the remaining data set for phthalates?

From: Carl Stivers [mailto:cstivers@anchorenv.com]
Sent: Tuesday, August 14, 2007 11:37 AM
To: Carl Stivers; Amanda Shellenberger; Amanda Spencer; Dawn Sanders; Jim McKenna; Scheffler, Linda; TARNOW Karen E; Andy Koulermos; Laura Jones; Koch.Kristine@epamail.epa.gov; LaFranchise, Nicole
Cc: Jim McKenna; Jessica Pisano; Christine Hawley; Gene Revelas; Bob Wyatt; Rick Applegate
Subject: Stormwater Technical Team Call Highlights (Aug. 13th call)

Stormwater Technical Team -

The Stormwater Technical Team (EPA/DEQ/LWG) discussed LWG's proposed approach for handling stormwater sediment trap samples yesterday. Here the meeting highlights and action items. As always, please let me know if I missed something. It was agreed that the next call would be on August 23 at
1 pm. The technical team agreed to the LWG proposed approach for sediment trap analyses including the following specific
points:

Reduce the mass of sample used for TOC analysis (from 1 gram to 0.1 grams), to provide more mass for chemical analyses
Use catch basin sediments collected from select locations for field and laboratory QA/QC analyses

In addition, the technical team agreed to the following changes in the LWG proposed analysis prioritization approach:

Use sample mass proposed for PAH/phthalates analyses for organochlorine analyses instead at stations WR-123 (Schnitzer Slip), WR-14 (Chevron Transportation), WR-161 (Portland Shipyard), WR-147/148 (Gunderson)
Use sample mass proposed for PCB analyses for organochlorine analyses instead at station OF-49 (City - St. Johns Area)

(Note that the LWG needs to obtain formal Exec. committee approval for these changes. We will notify the stormwater tech. team if LWG Exec.
cannot approve these changes for some reason.)

It was also agreed that the next call would discuss the sample completion information and whether it meets the original FSP objectives and to what extent this indicates a need for additional fall sampling.
To prepare for this discussion, the LWG agreed to obtain sample completion information on the T-4 stormwater stations from the Port and on the GE site stormwater sampling from DEQ. In addition, the LWG intends to summarize the percent detects for the Batch 2 and 3 stormwater composite data and, if possible in time, have this available for the next call as well.

It was also agreed that at the next call the group would start to talk about methods for calculating stormwater loads based on the program data.

Thanks.

Carl

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From: Carl Stivers
Sent: Monday, August 13, 2007 8:50 AM
To: Amanda Shellenberger; 'Amanda Spencer'; 'Dawn Sanders'; Jim McKenna; 'Scheffler, Linda'; 'TARNOW Karen E'; 'Andy Koulermos'; 'Laura Jones'; 'Koch.Kristine@epamail.epa.gov'; 'LaFranchise, Nicole'
Subject: RE: Stormwater Sediment Trap Sample Handling and Analysis Methods

Stormwater Tech Team -

The text below was also supposed to be provided to you with the two execl tables that were sent around previously. Again, my apologies for not getting this to you sooner. I will go over the contents of the text at the start of the call at 9 am (in a few minutes).

The sediment trap samples are summarized on the spreadsheet titled "Stormwater Outfall Sed Trap Sample Mass Analytical Aliquots" prepared by the LWG. It includes wet weight, percent solids, dry weight, and a potential scheme for analysis for each sediment trap sample and the catch basin sediments. Since the sample mass was limited from the sediment trap stations, catch basin sediments at some locations were collected for potential use as laboratory quality control samples (e.g.
matrix spike/matrix spike duplicate samples for organics and matrix spike/laboratory duplicate samples for metals and TOC, TSS) and field quality control samples (field duplicates). The approach detailed in the sediment trap spreadsheet includes the use of the catch basin sediments as field and lab QC samples as an option for discussion with the Stormwater Technical Team.

Two relevant issues that developed during analysis are summarized below:

> The two laboratories [CAS and Vista (formerly Alta)] that will be conducting the analyses were contacted to confirm receipt of upcoming samples and discuss the approach. Both laboratories indicated that to meet our low detection limits the minimum sample weights required for analysis for organic parameter groups were dry weight aliquots. This is not consistent with previous discussions with these labs or the information in the FSP and QAPP. The attached spreadsheet assumes the minimum sample masses for PCB congeners, organochlorine pesticides, PAHs/phthalates, metals, and herbicides in dry weight.

When conducting the total solid analysis, CAS did not use the minimum sample mass (1g) for most samples. CAS was notified about the limited sediment available from the sediment trap samples and was requested to use the minimum sample mass; however, the analyst who weighed the samples for the analysis consumed more than the minimum sample mass for most samples. The attached spreadsheet includes the actual weights used for total solids measurements.

Two separate schemes were developed in the Analytical Aliquot spreadsheet.
The first scheme details sample aliquots for each individual sample as a stand-only sample (i.e., field replicate samples are considered to be a different sample than its parent sample) and the second scheme details sample aliquots where field replicate samples are combined with their parent samples as one stand-alone sample to help increase available sample mass for analysis. Combining the field replicates is currently our recommended approach in concert with obtaining field and lab QC from catch basin sediment samples as noted above.

Both schemes were developed by calculating the dry weight from the percent solids measurements, subtracting out the actual wet weight mass used for the percent solids, TOC, and metals (if applicable) measurements, and calculating other aliquots for analysis. The aliquots were assigned in this spreadsheet based solely on the priority of analytes from the FSP. There are numerous options for each sample for distribution of sample mass for analysis. This spreadsheet was developed for use by the stormwater tech team for discussion purposes to determine the approach for each sample.
Obviously, the approach could vary sample by sample by reducing the sample size one of the analysis and consuming the remaining sample for another parameter group (e.g. reduce sample mass extracted for PAHs/phthalates to provide sample mass for metals analysis (3.5 g for metals will result in 2X DL). Also, note that while organics are extracted on a dry weight basis as noted above, metals will be extracted on a wet weight basis. A minimum of 7g wet weight is necessary for this analysis to meet project MRLs. Sample aliquots in the table show wet/dry mass needed for metals analysis (based on a sample's total solids content); dry weights were used for ease of calculation to determine sample mass remaining for analysis. Also, a procedural recommendation is that all of the remaining analytical aliquots will be created at one time so we know the sample is well homogenized and any issues with discrepancies in the amount of total sample (although we expect such discrepancies will be small) can be resolved then before the samples are extracted.

The second spreadsheet titled "Stormwater Summary," details each sample's expected sediment detection limit factor; the level of detection will be elevated by the number presented in each cell based on limited sample volume. For example, a value of 1 means the target DL will be met and a value of 2 means the actual achieved DL will be two times higher than the target DL. We have layered on top of this spreadsheet a color coding reflects the percentage of time each analyte group was detected at that station for the Batch 1 stormwater data.
While Batch 1 results do not provide an indication of detection frequency for the entire stormwater data set and some stations were not sampled in Batch 1, it is the currently available data set with which we can start to understand the frequency of detections in stormwater. The summary table is intended to help determine where we have or are likely to have data from either sediment traps and/or stormwater samples. For example, the table shows where we have a complete absence of information (no detection limit factor for sediments and no coloring for stormwater), a limited amount of data (large detection limit factor sediments and light coloring

for stormwater), and where we have an analyte group that is likely covered by both sampling methods (small detection limit factor for sediments and dark coloring for stormwater).

The Stormwater Technical Team asked for the LWG to propose a method for sediment trap sample handling. In summary, per the above discussion, we are proposing to recommend to EPA/DEQ members of the Stormwater Technical Team the following:

Follow the priority order of analyses as previously agreed upon and detailed for each station in the EPA approved Stormwater FSP
Combine field replicate samples into one samples available at some locations to achieve a higher sediment volume for analysis and to obtain data no more analyte groups at these locations
Use catch basin sediments collected at the locations noted in the detailed spreadsheet for field and laboratory QC

PCBs appear to be the most important chemical from an in-river risk perspective. This approach will allow us to obtain PCB data for the majority of sampling locations (sometimes at elevated DLs), which is likely to be supported by a substantial body of detected data in stormwater samples. The approach will also allow us to obtain PAH/Phthalate and Organochlorine pesticide data for those sites where these are the next highest priority analyte. (Note the sequence of the second/third priority analytes varies across the sample locations.) Across all sites, limited data will be obtained on third priority and higher analytes.

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From: Amanda Shellenberger
Sent: Wednesday, July 25, 2007 3:45 PM
To: 'Amanda Spencer'; 'Dawn Sanders'; 'Jim McKenna'; 'Scheffler, Linda'; 'TARNOW Karen E'; Carl Stivers; 'Andy Koulermos'; 'Laura Jones'; 'Koch.Kristine@epamail.epa.gov'; 'LaFranchise, Nicole'

Subject: Stormwater Sediment Trap Sample Handling and Analysis Methods

Stormwater Tech Team -

Good News! The Stormwater Sediment Trap Sample Handling and Analysis Methods were APPROVED with no changes by the Exec. Committee today.
I've attached the two files for your review. Let's set up a conference call to discuss. Please email me with your potential availability. The best times for Carl and me are August 6th, 8th, or 9th anytime.

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August 22, 2007 Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

From: Carl Stivers
Sent: Wed 8/22/2007 2:38 PM
To: 'Koch.Kristine@epamail.epa.gov'; 'Scheffler, Linda'; 'Amanda Spencer'; 'Andy Koulermos'; 'Laura Jones'; Amanda Shellenberger; 'Sanders, Dawn'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: 'Christine Hawley'; 'Gene Revelas'; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt
Subject: RE: Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Stormwater Technical Team -

We are having a call at 1 pm tomorrow (Aug. 23). Please use the following call in number:

Non-Responsive

Items on the agenda are:

1. Resolve additional proposal for sediment trap sample handling per City emails since last call.
2. Discuss data adequacy as it relates to FSP Rationale Objectives. The objective are: (with some text explanation of how the data will be used excerpted from the rationale):
    a. Stormwater contribution to fish tissue burdens: "Thus, it is necessary to determine the relative contribution of stormwater (as compared to other sources) to surface water concentrations of selected chemicals in the harbor. For stormwater, this would be done in terms of loading estimates."
    b. Stormwater contribution to recontamination potential: "To predict whether sediments would recontaminate at levels above the PRGs that will eventually be set for the Site, estimates of stormwater loads are needed for input into estimation tools and models described in Section 1.3; these load estimates must be on a spatial scale consistent with those estimation tools and models. The load estimates should be accompanied by partitioning measurements to assist in the estimation of chemical mass associated with particulates (that may settle to the sediment bed) versus dissolved mass."Atja
3. If the objectives are not adequately met, discuss if there is a need for more sampling in the fall to better meet these objectives.

With regards to the first item, the group requested via email an analysis of whether the phthalates in stormwater were likely a result of blank contamination or similar sampling artifacts. Attached is a table that summarizes this data analysis. In summary, slightly over one-half (155 of 306 results) of the stormwater results from all sampling events were qualified as estimated or undetected because of detections of phthalates in laboratory and field blanks. The stormwater blank results are attached.

With regards to the second and third items, attached are two tables summarizing the number of samples collected (and analytes for those samples) for all sites including the seven T-4 sites and GE Decommisioning site.

Talk to you tomorrow.

Carl

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lab_sample_id	sys_sample_code	Event	lab_anl_m	analysis_d	analysis_time	total_or_di	column_nu	result_type	reportable_	cas_rn	chemical_name	result_valu	lab_qualifie	val_qualifie	interpretive	detect_flag	result_com	custom_fie	method_de	reporting_	quantitatio	result_unit
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	1.2				Y			0.052	0.052	0.53	ug/l
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.021	J	J	J	Y	7		0.014	0.014	0.22	ug/l
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.14	J		J	Y			0.014	0.014	0.22	ug/l
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.34				Y			0.016	0.016	0.22	ug/l
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate		U		U	N			0.0074	0.0074	0.22	ug/l
K0701799-001	LW3-STW-WB01	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/16/2007	1/0/1900	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0053	0.0053	0.22	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.10	J		J	Y			0.06	0.06	0.61	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.023	J		J	Y			0.016	0.016	0.25	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.19	J	J	J	Y	7		0.016	0.016	0.25	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.93				Y			0.019	0.019	0.25	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.013	J		J	Y			0.0085	0.0085	0.25	ug/l
K0702215-003	LW3-STW-CWRB04	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	3/23/2007	1/0/1900	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0061	0.0061	0.25	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.076	J		J	Y			0.053	0.053	0.54	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.018	J		J	Y			0.014	0.014	0.22	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.099	J	J	J	Y	7		0.014	0.014	0.22	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.16	J		J	Y			0.016	0.016	0.22	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate		U		U	N			0.0075	0.0075	0.22	ug/l
K0702458-014	LW3-STW-CW10-W	Round 3A Stormwater Outfalls (March 2007 Storm E	E525.2	4/3/2007	1/0/1900	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0054	0.0054	0.22	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.098	J		J	Y			0.052	0.052	0.53	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.034	J		J	Y			0.014	0.014	0.22	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.29				Y			0.014	0.014	0.22	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.30				Y			0.016	0.016	0.22	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.028	J		J	Y			0.0074	0.0074	0.22	ug/l
K0702936-024	LW3-STW-CW20-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/13/2007	1/0/1900	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0053	0.0053	0.22	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.13	J		J	Y			0.052	0.052	0.53	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.035	J		J	Y			0.014	0.014	0.21	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.19	J	J	J	Y	7		0.014	0.014	0.21	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.16	J		J	Y			0.016	0.016	0.21	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.010	J		J	Y			0.0073	0.0073	0.21	ug/l
K0703271-001	LW3-STW-CW30-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/25/2007	5:00:00 PM	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0053	0.0053	0.21	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.17	J		J	Y			0.056	0.056	0.57	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.038	J	J	J	Y	7		0.015	0.015	0.23	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.15	J	J	J	Y	7		0.015	0.015	0.23	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.24				Y			0.017	0.017	0.23	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.016	J		J	Y			0.0079	0.0079	0.23	ug/l
K0703409-016	LW3-STW-CW40-W	Round 3A Stormwater Outfalls (April 2007 Storm Eve	E525.2	4/27/2007	11:58:00 PM	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0057	0.0057	0.23	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.25	J		J	Y			0.05	0.05	0.51	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.036	J	J	J	Y	7		0.014	0.014	0.21	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.16	J	J	J	Y	7		0.014	0.014	0.21	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.57				Y			0.016	0.016	0.21	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.049	J		J	Y			0.0071	0.0071	0.21	ug/l
K0703776-023	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	5/24/2007	20:27	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.0051	0.0051	0.21	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	0.50	J	J	J	Y	7		0.049	0.049	0.5	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.19	J	J	J	Y	7		0.013	0.013	0.2	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.83				Y			0.013	0.013	0.2	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.86				Y			0.015	0.015	0.2	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.060	J		J	Y			0.007	0.007	0.2	ug/l
K0704347-016	W900-T	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	12:29:00	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.005	0.005	0.2	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	1.4				Y			0.049	0.049	0.5	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.13	J	J	J	Y	7		0.013	0.013	0.2	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.82				Y			0.013	0.013	0.2	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.87				Y			0.015	0.015	0.2	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.058	J		J	Y			0.007	0.007	0.2	ug/l
K0704347-017	W900-D	Round 3A Stormwater Outfalls (May 2007 Storm Eve	E525.2	07-Jun-07	10:57:00	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.005	0.005	0.2	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	117-81-7	Bis(2-ethylhexyl) phthalate	2.5				Y			0.049	0.049	0.5	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	85-68-7	Butylbenzyl phthalate	0.078	J	J	J	Y	7		0.013	0.013	0.2	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	84-74-2	Dibutyl phthalate	0.39				Y			0.013	0.013	0.2	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	84-66-2	Diethyl phthalate	0.57				Y			0.015	0.015	0.2	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	131-11-3	Dimethyl phthalate	0.027	J		J	Y			0.007	0.007	0.2	ug/l
K0704956-014	LW3-STW-CW50-W	Round 3A Stormwater Outfalls (June 2007 Storm Eve	E525.2	6/19/2007	10:26	N	NA	TRG	Yes	117-84-0	Di-n-octyl phthalate		U		U	N			0.005	0.005	0.2	ug/l

Table 2. Sediment Trap Sample Prioritization Summary - Showing Target Detection Limit Factors for LWG Sites and Estimated for T4 Sites*

Outfall(s)	Facility or Location	PCB Congeners	TOC	Percent Solids	Organochlorine pesticides	PAHs and Phthalates	Metals	Herbicides	Grain size
Industrial Locations (10)									
WR-22	OSM	1	1	1	1	1	1	1.3	
WR-123	Schnitzer International Slip	1	1	1	1				
WR-384	Schnitzer - Riverside	1	1	1	1	1	1	1	
WR-107	GASCO	1	1	1	1	1	1	1	
WR-96	Arkema								
WR-14	Chevron - Transportation	1	1	1	1				
WR-161	Portland Shipyard	1	1	1	4				
WR-4	Sulzer Pump	3.3	1	1					
WR-145	Gunderson	6	1	1					
WR-147/148	Gunderson (former Schnitzer)	1	1	1	5.3				
Land Use Locations (11)									
Hwy 30	Hwy 30	1.8	1	1					
OF-49	City - St. Johns Area		1	1	22.2				
WR-67	Siltronic	1	1	1	4.8				
OF-22C, above Hwy 30	City - Forest Park Area	1	1	1	1	1	1	1	
OF-22B	City - Doane Lake Industrial Area	1.5	1	1					
OF-M1 (combined)	City - Mocks Bottom Industrial Area	1	1	1	1	1.6			
OF-M2	City - Mocks Bottom Industrial Area	1	1	1	1	1.6			
OF-22 (combined)	City - Willbridge Industrial Area	1.3	1	1					
OF-16	City - Heavy Industrial	1	1	1	1	1.2			
WR-218	UPRR Albina	1.9	1	1					
St. Johns Bridge	Highway drainage	1	1	1	1	2.4			
Multiple Land Use Locations (2)									
OF-18	City - Multiple Land Uses	1	1	1	1	1.1			
OF-19 (combined)	City - Multiple Land Uses	1	1	1	1	1	1	1	
GE (drains to OF-17)	Heavy Industrial	?	?	?	?	?	?	?	
WR-183	Heavy Industrial								
WR-181	Heavy Industrial	NA	NA	NA	NA	NA	NA	NA	
OF-52C	Light Industrial	1	1	1	1	1	1	NA?	
WR-177	Heavy Industrial	1	1	1	1	1	1	NA?	
WR-20	Heavy Industrial	1	1	1	1	1	1	NA?	
WR-169	Light Industrial	1	1	1	1	?	?	NA?	
OF-53	Residential	1	1	1	1	1	1	NA?	

*Detection limit factor shows how the target detection limit (DL) will be exceeded with the sample mass remaining. A factor of 1 means the target detection limit will be achieved. A factor of 2 means the actual DL will be two times higher than the target DL.

Chemical detected more than 81% of time in Batch 1 stormwater samples

Chemical detected 61-80% of the time in Batch 1 stormwater samples

Chemical detected 41-60% of the time in Batch 1 stormwater samples

Chemical detected 21-40% of the time in Batch 1 stormwater samples

Chemical detected 0-20% of the time in Batch 1 stormwater samples or not sampled

Yellow indicates proposed changes to sample use from last Stormwater Tech. Team call.

Status of Stormwater Outfall Composite Water Samples

Outfall(s)	Facility or Location	River Mile	Land Use	Number of Samples Collected as of June 16, 2007										Percent Complete
				TSS	TOC	DOC (filtered)	Total Metals	Diss. Metals (filtered)	PAHs	Phthalates	PCB Congeners	Herbicides	Pesticides	
OF-49	City - St. Johns Area	6.5	Residential	3	3	2	3	1	3	2	2	2	NA	**78**
SJB	Highway drainage	5.8	Major Transportation	6	6	5	4	3	3	3	3	3	NA	**133**
Hwy 30	Hwy 30	TBD	Major Transportation	3	3	2	3	2	3	NA	1	2	NA	**79**
OF-22C	City - Forest Park Area	6.9	Open Space (Forest Park)	2	2	2	2	1	2	2	2	2	NA	**63**
OF-18	City - Multiple Land Uses	9.7	Open Space/Heavy Industrial	4	4	3	4	3	3	3	3	3	NA	**111**
OF-19	City - Multiple Land Uses	8.4	Open Space/Heavy Industrial	5	5	4	4	3	3	NA	3	4	NA	**129**
OF-M1	City - Mocks Bottom Industrial Area	Lagoon	Light Industrial	4	4	3	4	3	3	NA	3	3	NA	**113**
OF-M2	City - Mocks Bottom Industrial Area	Lagoon	Light Industrial	4	4	3	4	2	4	4	4	3	NA	**119**
OF-22	City - Willbridge Industrial Area	7.7	Heavy Industrial	3	3	2	3	2	3	NA	3	3	NA	**92**
OF-22B	City - Doane Lake Industrial Area	6.9	Heavy Industrial	2	2	2	2	2	2	NA	2	2	2	**67**
OF-16	City - Heavy Industrial	9.7	Heavy Industrial	5	4	3	5	3	3	NA	3	3	NA	**121**
WR-107	GASCO	6.4	Heavy Industrial	4	4	3	4	3	3	NA	3	3	NA	**113**
WR-123	Schnitzer International Slip	3.7	Heavy Industrial	5	5	4	4	2	3	3	3	3	NA	**119**
WR-14	Chevron - Transportation	7.7	Heavy Industrial	5	5	4	5	3	3	NA	3	3	NA	**129**
WR-142/145	Gunderson	8.9	Heavy Industrial	2	2	1	2	1	2	1	1	1	NA	**48**
WR-147	Gunderson	9	Heavy Industrial	5	5	4	5	3	3	3	3	2	NA	**122**
WR-161	Portland Shipyard (Cascade General Site)	8.2	Heavy Industrial	4	4	3	4	3	3	3	3	3	NA	**111**
WR-22	OSM	2.1	Heavy Industrial	4	4	3	4	3	3	3	3	3	NA	**111**
WR-218	UPRR Albina	10	Heavy Industrial	2	2	2	2	2	2	NA	2	1	NA	**63**
WR-384	Schnitzer - Riverside	3.7	Heavy Industrial	5	5	4	4	2	4	NA	3	3	NA	**125**
WR-4	Sulzer Pump	10.4	Heavy Industrial	4	4	3	4	3	3	NA	3	3	NA	**113**
WR-67	Siltronic	6.6	Heavy Industrial	6	6	5	5	4	4	NA	4	3	NA	**154**
WR-96	Arkema	7.3	Heavy Industrial	4	4	4	4	3	3	3	2	1	3	**103**
Drains to OF-	GE Decomissioning	9.7	Heavy Industrial	2	2	2	2	2	2	NA	2	0	NA	**58**
WR-183	Basin R Terminal 4 Slip 1	4.3	Heavy Industrial	3	3	3	3	3	3	3	3	NA	NA	**100**
WR-181	Basin Q Terminal 4 Slip 1	4.3	Heavy Industrial	2	2	2	1	1	2	2	2	NA	2	**59**
OF-52C	City - Terminal 4 Area	4.3	Light Industrial	3	3	3	3	3	3	3	3	NA	3	**100**
WR-177	Basin M Terminal 4 Slip 1	4.3	Heavy Industrial	3	3	3	3	3	3	2	3	NA	3	**96**
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Heavy Industrial	3	3	3	3	3	3	3	3	NA	3	**100**
WR-169	Basin D Terminal 4 (Toyota)	4.7	Light Industrial	3	3	3	3	3	3	1	NA	NA	NA	**90**
OF-53	City - Residential above T4	5.1	Residential	3	3	3	2	2	3	3	3	NA	3	**93**
			Percent Complete	**122**	**120**	**100**	**113**	**83**	**97**	**87**	**90**	**86**	**90**	

Notes:

Percent completeness calculated as (analyses conducted/planned analyses) x 100

For selected outfalls, additional TSS and TOC aliquots were collected, and these additional aliquots are included in the overall completeness calculation of 100 percent, even though the completeness is less than 100 percent at individual stations.

Status of Stormwater Outfall Grab Water Samples or Filtered Samples (for T4 and GE)

Outfall(s)	Facility or Location	River Mile	Land Use	Number of Samples Collected as of June 16, 2007													Percent Complete
				TSS	TOC	DOC (filtered)	PAHs	PAHs (filtered)	Phthalates	Phthalates (filtered)	PCB Congeners	PCB Congeners (filtered)	Herbicides	Herbicides (filtered)	Pesticides	Pesticides (filtered)	
SJB	Highway drainage	5.8	Major Transportation	1	1	1	1	1	1	1	1	1	1	1	NA	NA	**100**
OF-18	City - Multiple Land Uses	9.7	Open Space/Heavy Industrial	1	1	1	1	1	1	1	1	1	1	1	NA	NA	**100**
OF-22	City - Willbridge Industrial Area	7.7	Heavy Industrial	1	1	1	1	1	NA	NA	1	1	0	0	NA	NA	**78**
OF-22B	City - Doane Lake Industrial Area	6.9	Heavy Industrial	1	1	1	1	1	NA	NA	1	1	1	1	1	1	**100**
WR-107	GASCO	6.4	Heavy Industrial	1	1	1	1	1	NA	NA	1	1	1	1	NA	NA	**100**
WR-123	Schnitzer International Slip	3.7	Heavy Industrial	1	1	1	1	1	1	1	1	1	1	1	NA	NA	**100**
WR-142/145	Gunderson	8.9	Heavy Industrial	1	1	1	1	1	1	1	1	1	1	1	NA	NA	**100**
WR-161	Portland Shipyard (Cascade General Site)	8.2	Heavy Industrial	2	2	2	2	2	2	2	2	2	2	2	NA	NA	**200**
WR-22	OSM	2.1	Heavy Industrial	1	1	1	1	1	1	1	1	1	1	1	NA	NA	**100**
WR-96	Arkema	7.3	Heavy Industrial	1	1	1	1	1	1	1	1	1	1	1	1	1	**100**
Drains to OF-	GE Decomissioning	9.7	Heavy Industrial	NA	NA	2	NA	2	NA	NA	NA	2	NA	0	NA	NA	**600**
WR-183	Basin R Terminal 4 Slip 1	4.3	Heavy Industrial	NA	NA	NA	NA	3	NA	1	NA	1	NA	NA	NA	1	**75**
WR-181	Basin Q Terminal 4 Slip 1	4.3	Heavy Industrial	NA	NA	NA	NA	1	NA	0	NA	0	NA	NA	NA	1	**25**
OF-52C	City - Terminal 4 Area	4.3	Light Industrial	NA	NA	NA	NA	3	NA	1	NA	1	NA	NA	NA	3	**100**
WR-177	Basin M Terminal 4 Slip 1	4.3	Heavy Industrial	NA	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	3	**75**
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Heavy Industrial	NA	NA	NA	NA	3	NA	1	NA	1	NA	NA	NA	3	**100**
WR-169	Basin D Terminal 4 (Toyota)	4.7	Light Industrial	NA	NA	NA	NA	3	NA	NA	NA	NA	NA	NA	NA	NA	**100**
OF-53	City - Residential above T4	5.1	Residential	NA	NA	NA	NA	3	NA	1	NA	1	NA	NA	NA	3	**100**
			Percent Complete	**110**	**110**	**110**	**110**	**103**	**114**	**100**	**110**	**113**	**100**	**100**	**100**	**70**	

August 24, 2007 Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

From: Koch.Kristine@epamail.epa.gov
Sent: Fri 8/24/2007 10:34 AM
To: Carl Stivers
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Stormwater Technical Team -

I've created a spreadsheet that may be helpful in initiating a discussion for data gaps (Please note that the GE data has not been included). The first sheet labeled "Sites" shows each site with the number of samples collected. Yellow highlighting means that it was a contaminant of interest at the site. Red highlighting means that the minimum number of samples (3 composite water & 1 sediment) were not collected at the site. The numbers in the far right columns show the number of data gaps for the site for water and solids and the numbers at the bottom show the number of data gaps for the column (media/chemical).
The second sheet labeled "Land Use" summarizes the data by land use.
The blue highlight means it is a unique site and yellow highlighting means that it was the contaminant of interest at the site (same as the other sheet). Red highlight means that the minimum number of samples were not collected. Green highlight in the total row below each land use means that the minimum required samples was collected (the gray area below the total row shows the minimum number of samples needed). The far right is my initial recommendations for data gaps that need to be filled. For heavy industrial sites, the data gaps are associated with the gaps in data for the unique site rather than for the land use - I put the chemicals in parens.

I see 3 items for discussion on this:

1) The number of minimum samples needed for each land use.

2) A review of the data to see if the data gaps need to be filled. An example here is metals for mixed land use: There are 17 total water, 12 dissolved water, and 1 sediment trap. Do we need more solids samples or is this enough information?

3) A review of the actual analytical data to see if there are other data gaps.

(See attached file: Stormwater Data gaps.xls)

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August 24, 2007 Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

From: Koch.Kristine@epamail.epa.gov
Sent: Fri 8/24/2007 11:51 AM
To: Jim McKenna
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Carl Stivers; Sanders, Dawn; Gene Revelas; Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Jim - that is exactly my thoughts and why I put the 3 points of discussion based on these findings.

Thanks,

Kristine Koch
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"McKenna, James (Jim)" <Jim.McKenna@portofportland.com> 08/24/2007 11:29 AM

To: Kristine Koch/R10/USEPA/US@EPA, "Carl Stivers" <cstivers@anchorenv.com>

cc: "Andy Koulermos" <akoulermos@newfields.com>, "Amanda Shellenberger" <ashellenberger@anchorenv.com>, "Amanda Spencer" <aspencer@ashcreekassociates.com>, "Christine Hawley" <chawley@integral-corp.com>, "Sanders, Dawn" <DAWNS@BES.CI.PORTLAND.OR.US>, "Gene Revelas" <grevelas@integral-corp.com>, "Jessica Pisano" <jpisano@anchorenv.com>, "Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US>, "Laura Jones"

<ljones@integral-corp.com>,
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d.com>, "Rick Applegate"
<RICKA@bes.ci.portland.or.us>,
"Bob Wyatt" <rjw@nwnatural.com>,
"TARNOW Karen E"
<TARNOW.Karen@deq.state.or.us>
Subject
RE: Stormwater Technical Team
Call Thursday Aug. 23rd at 1 pm

Thanks Kristine, this is a useful summary. I would like to get some clarification from the SW subgroup regarding the definition of "data gaps" on the first sheet. Typically, we identify "target numbers" in our FSPs (i.e., our target is to get 3 water and one sed trap sample from each outfall). The table circulated by Kristine identifies whether the target # was achieved at each site, which is very important information and can help resolve whether a data gap exists. However, I do not think we should equate "unobtained targets" with "data gaps" at this stage. Rather, I would suggest that the subgroup evaluate all the analytical data from the lab before determining there is a data gap.

Jim.

-----Original Message-----
From: Koch.Kristine@epamail.epa.gov
[mailto:Koch.Kristine@epamail.epa.gov]
Sent: Friday, August 24, 2007 10:34 AM
To: Carl Stivers
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; McKenna, James (Jim); Jessica Pisano; Scheffler, Linda; Laura Jones; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Stormwater Technical Team -

I've created a spreadsheet that may be helpful in initiating a discussion for data gaps (Please note that the GE data has not been included).

-Remaining text deleted-

Outfall(s)	Facility or Location	Land Use	PCB Congeners			Organochlorine pesticides			PAHs			Phthalates			Metals			TPH		Herbicides		Grain size	TOC		DOC		Percent Solids		Turbidity	Data Gaps (by Site)	
			Water		Solids	Water		Solids	Water		Solids	Water		Solids	Water		Solids	Water	Solids	Water	Solids	Solids	Water	Solids	Water	Solids	Water	Solids	Water	Water	Solids
Industrial Locations (10)			total	dissolved		total	dissolved		total	dissolved		total	dissolved		total	dissolved		Total												
WR-22	OSM	Heavy Industrial	3		1			1	3		1	3		1	4	3	1			3	1		4	1	3		4	1			1
WR-123	Schnitzer International Slip	Heavy Industrial	3		1			1	3			3			4	2				3			5	1	4		5	1		1	5
WR-384	Schnitzer - Riverside	Heavy Industrial	3		1			1	4		1			1	4	2	1			3	1		5	1	4		5	1		1	1
WR-107	GASCO	Heavy Industrial	3		1			1	3		1			1	4	3	1			3	1		4	1	3		4	1			1
WR-96	Arkema	Heavy Industrial	2			3			3			3			4	3				1			4		4		4			2	8
WR-14	Chevron - Transportation	Heavy Industrial	3		1			1	3						5	3				3			5	1	4		5	1			5
WR-161	Portland Shipyard	Heavy Industrial	3		1			1	3			3			4	3				3			4	1	3		4	1			5
WR-4	Sulzer Pump	Heavy Industrial	3		1				3						4	3				3			4	1	3		4	1			6
WR-145	Gunderson	Heavy Industrial	1		1				1			1			1	1				1			1	1	1		1	1		9	6
WR-147/148	Gunderson (former Schnitzer)	Heavy Industrial	3		1			1	3			3			5	3				2			5	1	4		5	1		1	5
OF-M1 (combined)	City - Mocks Bottom Industrial Area	Mixed Industrial	3		1			1	3		1			1	4	3				3			4	1	3		4	1			3
GE																															
Land Use Locations (11)																															
OF-22C, above Hwy 30	City - Forest Park Area	Open Space	2		1			1	2		1	2		1	2	1	1			2			2	1	2		2	1		9	2
OF-49	City - St. Johns Area	Residential	2					1	3			2			3	1				2			3	1	2		3	1		5	6
OF-53	City	Residential	3	1	1	3	3	1	3	3	1	3	1	1	2	2	1	3	1		1	1	3	1	3		3	1	3	3	
Hwy 30	Hwy 30	Major Transportation	1						3						3	2				2			3		2		3			4	9
St. Johns Bridge	Highway drainage	Major Transportation	3		1			1	3		1	3		1	4	3				3			6	1	5		6	1			3
OF-M2	City - Mocks Bottom Industrial Area	Light Industrial	4		1			1	4		1	4		1	4	2				3			4	1	3		4	1		1	3
OF-52C	T4-City Outfall (Basin T)	Light Industrial	3	1	1	3	3	1	3	3	1	3	1	1	3	3	1	3	1		1	1	3	1	3		3	1	3	1	
WR-169	T4-Basin D (Toyota)	Light Industrial			1			1	3	3	1	1	0	1	3	3	1	3	1		1		3	1	3		3	1	3	4	1
OF-16	City - Heavy Industrial	Mixed Industrial	3		1			1	3		1			1	5	3				3			4	1	3		5	1			3
OF-22B	City - Doane Lake Industrial Area	Heavy Industrial	2		1	2			2						2	2				2			2	1	2		2	1		9	6
OF-22 (combined)	City - Willbridge Industrial Area	Heavy Industrial	3		1				3						3	2				3			3	1	2		3	1		2	6
WR-218	UPRR Albina	Heavy Industrial	2		1				2						2	2				1			2	1	2		2	1		8	6
WR-67	Siltronic	Heavy Industrial	4		1			1	4						5	4				3			6	1	5		6	1			5
WR-183	T4-Basin R (Slip 1)	Heavy Industrial	3	1		1	1		3	3		3	1		3	3		3					3		3		3		3	1	9
WR-181	T4-Basin Q (Slip 1)	Heavy Industrial	2	0		2	1		2	1		2	0		1	1		2					2		2		2		2	9	9
WR-177	T4-Basin M (Slip 1)	Heavy Industrial	3	0	1	3	3	1	3	3	1	2	0	1	3	3	1	3	1		1	1	3	1	3		3	1	3	2	
WR-20	T4-Basin L (Wheeler Bay)	Heavy Industrial	3	1	1	3	3	1	3	3	1	3	1	1	3	3	1	3	1		1	1	3	1	3		3	1	3	1	
Multiple Land Use Locations (2)																															
OF-18	City - Multiple Land Uses	Mixed Industrial	3		1			1	3		1	3		1	4	3				3			4	1	3		4	1			3
OF-19 (combined)	City - Multiple Land Uses	Mixed Industrial	3		1			1	3		1			1	4	3	1			4	1		5	1	4		5	1			1
		Total Data Gaps	9		5	2		9	5		15	6		15	6	12	20			15	21	26	5	3	8		5	4			

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This document is currently under review by US EPA and its federal, state and tribal partners, and is subject to change in whole or in part.

August 27, 2007 Highlights Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

From: Carl Stivers
Sent: Mon 8/27/2007 3:24 PM
To: 'Koch.Kristine@epamail.epa.gov'; 'Scheffler, Linda'; 'Amanda Spencer'; 'Andy Koulermos'; 'Laura Jones'; Amanda Shellenberger; 'Sanders, Dawn'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: 'Christine Hawley'; 'Gene Revelas'; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: Highlights Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Stormwater Technical Team –

As promised here are highlights from the last call. As always, please let me know if I missed something important.

The next call will be on September 14th starting at 1:15 pm with the same call in number: Non-Responsive Non-Responsive

The three agenda items noted in the email below were discussed.

The first agenda item was to resolve the sediment trap sample handling approach. It was agreed that the approach reflected in the sediment trap summary table provided for the call would be used. LWG members noted that this approach would have to undergo formal LWG Exec approval before the samples would be released for lab analysis. We expect that approval to be discussed on by LWG Exec on August 29th.

The second and third agenda items (regarding data adequacy to meet FSP objectives and any additional sampling needs) was discussed pretty much as a one topic and a variety of concepts were raised and discussed. It was agreed that further data analysis and summarization was needed in order for the group to reach an opinion(s) on the adequacy of the data set. The LWG consultants (Anchor and Integral) with assistance from the City agreed to work on some additional data summarization approaches for presentation to the team. The primary items discussed were:

- In general, organize the completeness data (samples/analytes collected by station) by land use type and site specific (for some industrial sites) categories
- This would be organized separately for stormwater composite samples and sediment trap samples. Then a combined analysis—looking at completeness across these sample types—would also be prepared.
- This would include also reviewing how some specific industrial sites might be used as representative of the heavy industry category in general for some chemicals. For example, pesticides from the Gasco site, which is primarily a PAH site.

It was also discussed that the above analysis could move into examining the actual data (e.g., amounts of detects, magnitude of detects, incidence of blank contamination or other sampling artifacts, variability seen within field replicates etc.) and this might provide additional insight into

data adequacy for FSP objectives. However, it was generally agreed that such an analysis would take longer and would not be included in the above initial tasks.

The LWG consultants will work on this with the City such that it can be issued about a week prior to the next call (targeting September 7).

After the call Kristine Koch provided some additional data analysis along the lines of that discussed during the call and summarized the following general concepts that should be examined:

1) The number of minimum samples needed for each land use.

2) A review of the data to see if the data gaps need to be filled. An example here is metals for mixed land use: There are 17 total water, 12 dissolved water, and 1 sediment trap. Do we need more solids samples or is this enough information?

3) A review of the actual analytical data to see if there are other data gaps.

As noted above, the LWG consultants expect to start by focusing on these first two items, at least for right now.

Thanks.

Carl

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cstivers@anchorenv.com

From: Carl Stivers
Sent: Wednesday, August 22, 2007 2:38 PM
To: 'Koch.Kristine@epamail.epa.gov'; 'Scheffler, Linda'; 'Amanda Spencer'; 'Andy Koulermos';

'Laura Jones'; Amanda Shellenberger; 'Sanders, Dawn'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: 'Christine Hawley'; 'Gene Revelas'; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt
Subject: RE: Stormwater Technical Team Call Thursday Aug. 23rd at 1 pm

Stormwater Technical Team -

<< File: B010162_Blanks_Phathalates.xls >> << File: Storm Sample Matrix with T4 and GE.xls >> << File: Sediment Trap Summary Est.xls >>

We are having a call at 1 pm tomorrow (Aug. 23). Please use the following call in number:

Non-Responsive

Items on the agenda are:

4. Resolve additional proposal for sediment trap sample handling per City emails since last call.
5. Discuss data adequacy as it relates to FSP Rationale Objectives. The objective are: (with some text explanation of how the data will be used excerpted from the rationale):
    a. Stormwater contribution to fish tissue burdens: “Thus, it is necessary to determine the relative contribution of stormwater (as compared to other sources) to surface water concentrations of selected chemicals in the harbor. For stormwater, this would be done in terms of loading estimates.”
    b. Stormwater contribution to recontamination potential: “To predict whether sediments would recontaminate at levels above the PRGs that will eventually be set for the Site, estimates of stormwater loads are needed for input into estimation tools and models described in Section 1.3; these load estimates must be on a spatial scale consistent with those estimation tools and models. The load estimates should be accompanied by partitioning measurements to assist in the estimation of chemical mass associated with particulates (that may settle to the sediment bed) versus dissolved mass.”Atja
6. If the objectives are not adequately met, discuss if there is a need for more sampling in the fall to better meet these objectives.

With regards to the first item, the group requested via email an analysis of whether the phthalates in stormwater were likely a result of blank contamination or similar sampling artifacts. Attached is a table that summarizes this data analysis. In summary, slightly over one-half (155 of 306 results) of the stormwater results from all sampling events were qualified as estimated or undetected because of detections of phthalates in laboratory and field blanks. The stormwater blank results are attached.

With regards to the second and third items, attached are two tables summarizing the number of samples collected (and analytes for those samples) for all sites including the seven T-4 sites and GE Decommisioning site.

Talk to you tomorrow.

Carl

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Outfall(s)	Facility or Location	Land Use	PCB Congeners			Organochlorine pesticides			PAHs			Phthalates			Metals			TPH		Herbicides		Grain size	TOC		DOC		Percent Solids		Turbidity	Data Needs
			Water		Solids	Water		Solids	Water		Solids	Water		Solids	Water		Solids	Water	Solids	Water	Solids	Solids	Water	Solids	Water	Solids	Water	Solids	Water	
			total	dissolved		total	dissolved		total	dissolved		total	dissolved		total	dissolved		Total								TSS			
OF-22C, above Hwy 30	City - Forest Park Area	Open Space	2		1			1	2		1	2		1	2	1	1			2			2	1	2		2	1		
		Total	2		1			1	2		1	2		1	2	1	1			2	0	0	2	1	2		2	1		1 stormwater composite: OF-22C
		Need	3		1			1	3		1	3		1	3	3	1			3	1		3	1	3		3	1		
OF-49	City - St. Johns Area	Residential	2					1	3			2			3	1				2			3	1	2		3	1		
OF-53	City	Residential	3	1	1	3	3	1	3	3	1	3	1	1	2	2	1	3	1		1	1	3	1	3		3	1	3	
		Total	5	1	1	3	3	2	6	3	1	5	1	1	5	3	1	3	1	2	1	1	6	2	5		6	2	3	1 stormwater composite/redeployment of sediment trap: OF-49
		Need	6		2	3		2	6		2	6		2	6		2			6	2		6	2	6		6	2		
Hwy 30	Hwy 30	Major Transportation	1						3						3	2				2			3		2		3			
St. Johns Bridge	Highway drainage	Major Transportation	3		1			1	3		1	3		1	4	3				3			6	1	5		6	1		
		Total	4		1			1	6		1	3		1	7	5	0			5	0	0	9	1	7		9	1		Redeployment of sediment trap: Hwy 30
		Need	6		2			2	6		2	3		2	6	6	2			6	2		6	2	6		6	2		
OF-M2	City - Mocks Bottom Industrial Area	Light Industrial	4		1			1	4		1	4		1	4	2				3			4	1	3		4	1		
OF-52C	T4-City Outfall (Basin T)	Light Industrial	3	1	1	3	3	1	3	3	1	3	1	1	3	3	1	3	1		1	1	3	1	3		3	1	3	
WR-169	T4-Basin D (Toyota)	Light Industrial						1	3	3	1	1	0	1	3	3	1	3	1		1		3	1	3		3	1		
		Total	7	1	3	3	3	3	10	6	3	8	1	3	10	8	2	6	2	3	2	1	10	3	9		10	3	6	None
		Need	6		3	3		3	9		3	9		3	9		3			6	3		9	3	9		9	3		
WR-22	OSM	Heavy Industrial	3		1			1	3		1	3		1	4	3	1			3	1		4	1	3		4	1		
WR-123	Schnitzer International Slip	Heavy Industrial	3		1			1	3			3			4	2				3			5	1	4		5	1		Redeployment of sediment trap: WR-123 (phthalates, metals)
WR-384	Schnitzer - Riverside	Heavy Industrial	3		1			1	4		1			1	4	2	1			3	1		5	1	4		5	1		
WR-107	GASCO	Heavy Industrial	3		1			1	3		1			1	4	3	1			3	1		4	1	3		4	1		
WR-96	Arkema	Heavy Industrial	2			3			3			3			4	3				1			4		4		4			Redeployment of sediment trap: WR-96 (PCB, pesticides, phthalates, herbicides, solids)
WR-14	Chevron - Transportation	Heavy Industrial	3		1			1	3						5	3				3			5	1	4		5	1		Redeployment of sediment trap: WR-14 (PAH)
WR-161	Portland Shipyard	Heavy Industrial	3		1			1	3			3			4	3				3			4	1	3		4	1		Redeployment of sediment trap: WR-161 (PAH, phthalates, metals)
WR-4	Sulzer Pump	Heavy Industrial	3		1				3						4	3				3			4	1	3		4	1		Redeployment of sediment trap: WR-4 (PAH, metals)
WR-145	Gunderson	Heavy Industrial	1		1				1			1			1	1				1			1	1	1		1	1		2 stormwater composites/redeployment of sediment trap: WR-145 (PCB, PAH, phthalates, metals)
WR-147/148	Gunderson (former Schnitzer)	Heavy Industrial	3		1			1	3			3			5	3				2			5	1	4		5	1		Redeployment of sediment trap: WR-147/148 (phthalates, metals)
GE		Heavy Industrial																												
OF-22B	City - Doane Lake Industrial Area	Heavy Industrial	2		1	2			2						2	2				2			2	1	2		2	1		1 stormwater composite: OF-22B
OF-22 (combined)	City - Willbridge Industrial Area	Heavy Industrial	3		1				3						3	2				3			3	1	2		3	1		
WR-218	UPRR Albina	Heavy Industrial	2		1				2						2	2				1			2	1	2		2	1		
WR-67	Siltronic	Heavy Industrial	4		1			1	4						5	4				3			6	1	5		6	1		
WR-183	T4-Basin R (Slip 1)	Heavy Industrial	3	1		1	1		3	3		3	1		3	3		3					3		3		3		3	
WR-181	T4-Basin Q (Slip 1)	Heavy Industrial	2	0		2	1		2	1		2	0		1	1		2					2		2		2		2	
WR-177	T4-Basin M (Slip 1)	Heavy Industrial	3	0	1	3	3	1	3	3	1	2	0	1	3	3	1	3	1		1	1	3	1	3		3	1	3	
WR-20	T4-Basin L (Wheeler Bay)	Heavy Industrial	3	1	1	3	3	1	3	3	1	3	1	1	3	3	1	3	1		1	1	3	1	3		3	1	3	
		Total (less site spec)	42	2	12	9	8	10	35	10	3	10	2	5	39	32	4	11	2	32	5	2	65	15	55		65	15	11	None
		Need	24		8	10		8	24		8	12		8	24		8			24	8		24	8	24		24	8		
OF-M1 (combined)	City - Mocks Bottom Industrial Area	Mixed Industrial	3		1			1	3		1			1	4	3				3			4	1	3		4	1		Redeployment of sediment trap: OF-M1 (metals, herbicides)
OF-16	City - Heavy Industrial	Mixed Industrial	3		1			1	3		1			1	5	3				3			4	1	3		5	1		
OF-18	City - Multiple Land Uses	Mixed Industrial	3		1			1	3		1	3		1	4	3				3			4	1	3		4	1		Redeployment of sediment trap: OF-18 (metals, herbicides)
OF-19 (combined)	City - Multiple Land Uses	Mixed Industrial	3		1			1	3		1			1	4	3	1			4	1		5	1	4		5	1		
		Total	9		3			4	9		3	3		4	17	12	1			13	1	0	17	4	13		18	4		
		Need	9		3			4	9		3	3		4	12	12	4			12	4		12	4	12		12	4		

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September 12, 2007 Next Call Sept 14th at 1:15pm

From: Carl Stivers
Sent: Wed 9/12/2007 11:43 AM
To: 'Koch.Kristine@epamail.epa.gov'; 'Scheffler, Linda'; 'Amanda Spencer'; 'Andy Koulermos'; 'Laura Jones'; Amanda Shellenberger; 'Sanders, Dawn'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: 'Christine Hawley'; 'Gene Revelas'; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: Next Call Sept 14th at 1:15pm

Stormwater Techncial Team

The next call will be on September 14th starting at 1:15 pm with the same call in number: Non-Responsive Non-Responsive

At the last meeting we previously discussed having some different formats of summary completeness data that focused more on categories of land uses that will be relevant to loading calculations. Anchor and Integral worked with the City to develop the attached tables. My apologies for not getting this out sooner.

The tables include three types of summaries: one for stormwater, one for sediments, and one for a summary of both. There are some nuances for all tables that I will need to go over during the start of the call. However, one thing that may stand out for you is the stormwater table, which looks at the number of completed samples in two ways. The first way is looking at the sites on an individual basis such that actual samples over the planned number of samples (usually 3) for that site are not calculated to contribute to the total for that land use category. The second way is to look at land use groups as a group and just tally the total number of samples across all groups. The City suggested that this differentiation may be important, and they can explain more about why during the call.

I suggest our agenda for this call is similar to the last one, but with the benefit of having these additional tables. Therefore, the agenda is still:

1. Discuss data adequacy as it relates to FSP Rationale Objectives.
2. If the objectives are not adequately met, discuss if there is a need for more sampling in the fall to better meet these objectives.

Talk to you soon.

Carl

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Status of Stormwater Outfall Composite Water Samples

Outfall(s)	Facility or Location	River Mile	Land Use Category	Land Use	Number of Samples Excluding Samples Over Site Planned Maximum (over 3)									
					PCB Congeners	TSS	TOC	Pesticides	PAHs	Phthalates	Total Metals	Herbicides	Diss. Metals (filtered)	DOC (filtered)
OF-22	City - Willbridge Industrial Area	7.7	Land Use	Heavy Industrial	3	3	3	NA	3	NA	3	3	2	2
OF-22B	City - Doane Lake Industrial Area	6.9	Land Use	Heavy Industrial	2	2	2	2	2	NA	2	2	2	2
OF-16	City - Heavy Industrial	9.7	Land Use	Heavy Industrial	3	3	3	NA	3	NA	3	3	3	3
WR-218	UPRR Albina	10	Land Use	Heavy Industrial	2	2	2	NA	2	NA	2	1	2	2
WR-67	Siltronic	6.6	Land Use	Heavy Industrial	3	3	3	NA	3	NA	3	3	3	3
WR-183	Basin R Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	3	3	3	NA	3	3	3	0	3	3
WR-181	Basin Q Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	2	2	2	2	2	2	1	0	1	2
WR-177	Basin M Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	3	3	3	3	3	2	3	0	3	3
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Land Use	Heavy Industrial	3	3	3	3	3	3	3	0	3	3
				Subtotal Planned	27	27	27	3	27	12	27	27	27	27
				Subtotal Actual	24	24	24	10	24	10	23	12	22	23
				Missing	3	3	3	0	3	2	4	15	5	4
				Percent Missing	11%	11%	11%	0%	11%	17%	15%	56%	19%	15%
OF-M1	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	3	3	3	NA	3	NA	3	3	3	3
OF-M2	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	3	3	3	NA	3	3	3	3	2	3
OF-52C	City - Terminal 4 Area	4.3	Land Use	Light Industrial	3	3	3	3	3	3	3	0	3	3
WR-169	Basin D Terminal 4 (Toyota)	4.7	Land Use	Light Industrial	0	3	3	NA	3	1	3	0	3	3
				Subtotal Planned	12	12	12	0	12	9	12	6	12	12
				Subtotal Actual	9	12	12	3	12	7	12	6	11	12
				Missing	3	0	0	0	0	2	0	0	1	0
				Percent Missing	25%	0%	0%	0%	0%	22%	0%	0%	8%	0%
SJB	Highway drainage	5.8		Major Transportation	3	3	3	NA	3	3	3	3	3	3
			Land Use											
Hwy 30*	Hwy 30*	TBD	Land Use	Major Transportation*	1	3	3	NA	3	NA	3	2	2	2
				Subtotal Planned	6	6	6	0	6	3	6	6	6	6
				Subtotal Actual	4	6	6	0	6	3	6	5	5	5
				Missing	2	0	0	0	0	0	0	1	1	1
				Percent Missing	33%	0%	0%	0%	0%	0%	0%	17%	17%	17%
OF-22C	City - Forest Park Area	6.9	Land Use	Open Space (Forest Park)	2	2	2	NA	2	2	2	2	1	2
				Subtotal Planned	3	3	3	0	3	3	3	3	3	3
				Subtotal Actual	2	2	2	0	2	2	2	2	1	2
				Missing	1	1	1	0	1	1	1	1	2	1
				Percent Missing	33%	33%	33%	0%	33%	33%	33%	33%	67%	33%
OF-49	City - St. Johns Area	6.5	Land Use	Residential	2	3	3	NA	3	2	3	2	1	2
OF-53	City - Residential above T4	5.1	Land Use	Residential	3	3	3	3	3	3	2	0	2	3
				Subtotal Planned	6	6	6	0	6	6	6	6	6	6
				Subtotal Actual	5	6	6	3	6	5	5	2	3	5
				Missing	1	0	0	0	0	1	1	4	3	1
				Percent Missing	17%	0%	0%	0%	0%	17%	17%	67%	50%	17%
OF-18	City - Multiple Land Uses	9.7	Multiple Land Use	Open Space/Heavy Ind.	3	3	3	NA	3	3	3	3	3	3
OF-19	City - Multiple Land Uses	8.4	Multiple Land Use	Open Space/Heavy Ind.	3	3	3	NA	3	NA	3	3	3	3
				Subtotal Planned	6	6	6	0	6	3	6	6	6	6
				Subtotal Actual	6	6	6	0	6	3	6	6	6	6
				Missing	0	0	0	0	0	0	0	0	0	0
				Percent Missing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
WR-107	GASCO	6.4	Specific Industrial	Heavy Industrial	3	3	3	NA	3	NA	3	3	3	3
WR-123	Schnitzer International Slip	3.7	Specific Industrial	Heavy Industrial	3	3	3	NA	3	3	3	3	2	3
WR-14	Chevron - Transportation	7.7	Specific Industrial	Heavy Industrial	3	3	3	NA	3	NA	3	3	3	3
WR-142/145	Gunderson	8.9	Specific Industrial	Heavy Industrial	1	2	2	NA	2	1	2	1	1	1
WR-147	Gunderson	9	Specific Industrial	Heavy Industrial	3	3	3	NA	3	3	3	2	3	3
WR-161	Portland Shipyard	8.2	Specific Industrial	Heavy Industrial	3	3	3	NA	3	3	3	3	3	3
WR-22	OSM	2.1	Specific Industrial	Heavy Industrial	3	3	3	NA	3	3	3	3	3	3
WR-384	Schnitzer - Riverside	3.7	Specific Industrial	Heavy Industrial	3	3	3	NA	3	NA	3	3	2	3
WR-4	Sulzer Pump	10.4	Specific Industrial	Heavy Industrial	3	3	3	NA	3	NA	3	3	3	3
WR-96	Arkema	7.3	Specific Industrial	Heavy Industrial	2	3	3	3	3	3	3	1	3	3
Drains to OF-17	GE Decomissioning	9.7	Specific Industrial	Heavy Industrial	1	1	1	NA	1	NA	1	0	1	1
				Subtotal Planned	33	33	33	3	33	18	33	33	33	33
				Subtotal Actual	28	30	30	3	30	16	30	25	27	29
				Missing	5	3	3	0	3	2	3	8	6	4
				Percent Missing	15%	9%	9%	0%	9%	11%	9%	24%	18%	12%

Status of Stormwater Outfall Composite Water Samples

Outfall(s)	Facility or Location	River Mile	Land Use Category	Land Use	Total Number of Samples Collected										Drains to AOPC
					PCB Congeners	TSS	TOC	Pesticides	PAHs	Phthalates	Total Metals	Herbicides	Diss. Metals (filtered)	DOC (filtered)	
OF-22	City - Willbridge Industrial Area	7.7	Land Use	Heavy Industrial	3	3	3	NA	3	NA	3	3	2	2	17
OF-22B	City - Doane Lake Industrial Area	6.9	Land Use	Heavy Industrial	2	2	2	2	2	NA	2	2	2	2	14
OF-16	City - Heavy Industrial	9.7	Land Use	Heavy Industrial	3	5	4	NA	3	NA	5	3	3	3	24
WR-218	UPRR Albina	10	Land Use	Heavy Industrial	2	2	2	NA	2	NA	2	1	2	2	25
WR-67	Siltronic	6.6	Land Use	Heavy Industrial	4	6	6	NA	4	NA	5	3	4	5	11
WR-183	Basin R Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	3	3	3	NA	3	3	3	0	3	3	T4
WR-181	Basin Q Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	2	2	2	2	2	2	1	0	1	2	T4
WR-177	Basin M Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	3	3	3	3	3	2	3	0	3	3	T4
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Land Use	Heavy Industrial	3	3	3	3	3	3	3	0	3	3	T4
				Subtotal Planned	27	27	27	3	27	12	27	27	27	27	
				Subtotal Actual	25	29	28	10	25	10	27	12	23	25	
				Missing	2	0	0	0	2	2	0	15	4	2	
				Percent Missing	7%	0%	0%	0%	7%	17%	0%	56%	15%	7%	
OF-M1	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	3	4	4	NA	3	NA	4	3	3	3	22
OF-M2	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	4	4	4	NA	4	4	4	3	2	3	23
OF-52C	City - Terminal 4 Area	4.3	Land Use	Light Industrial	3	3	3	3	3	3	3	0	3	3	T4
WR-169	Basin D Terminal 4 (Toyota)	4.7	Land Use	Light Industrial	0	3	3	NA	3	1	3	0	3	3	T4
				Subtotal Planned	12	12	12	0	12	9	12	6	12	12	
				Subtotal Actual	10	14	14	3	13	8	14	6	11	12	
				Missing	2	0	0	0	0	1	0	0	1	0	
				Percent Missing	17%	0%	0%	0%	0%	11%	0%	0%	8%	0%	
SJB	Highway drainage	5.8		Major Transportation	3	6	6	NA	3	3	4	3	3	5	
			Land Use												None
Hwy 30*	Hwy 30*	TBD	Land Use	Major Transportation*	1	3	3	NA	3	NA	3	2	2	2	19
				Subtotal Planned	6	6	6	0	6	3	6	6	6	6	
				Subtotal Actual	4	9	9	0	6	3	7	5	5	7	
				Missing	2	0	0	0	0	0	0	1	1	0	
				Percent Missing	33%	0%	0%	0%	0%	0%	0%	17%	17%	0%	
OF-22C	City - Forest Park Area	6.9	Land Use	Open Space (Forest Park)	2	2	2	NA	2	2	2	2	1	2	14
				Subtotal Planned	3	3	3	0	3	3	3	3	3	3	
				Subtotal Actual	2	2	2	0	2	2	2	2	1	2	
				Missing	1	1	1	0	1	1	1	1	2	1	
				Percent Missing	33%	33%	33%	0%	33%	33%	33%	33%	67%	33%	
OF-49	City - St. Johns Area	6.5	Land Use	Residential	2	3	3	NA	3	2	3	2	1	2	None
OF-53	City - Residential above T4	5.1	Land Use	Residential	3	3	3	3	3	3	2	0	2	3	T4
				Subtotal Planned	6	6	6	0	6	6	6	3	6	6	
				Subtotal Actual	5	6	6	3	6	5	5	2	3	5	
				Missing	1	0	0	0	0	1	1	1	3	1	
				Percent Missing	17%	0%	0%	0%	0%	17%	17%	33%	50%	17%	
OF-18	City - Multiple Land Uses	9.7	Multiple Land Use	Open Space/Heavy Ind.	3	4	4	NA	3	3	4	3	3	3	19
OF-19	City - Multiple Land Uses	8.4	Multiple Land Use	Open Space/Heavy Ind.	3	5	5	NA	3	NA	4	4	3	4	18
				Subtotal Planned	6	6	6	0	6	3	6	6	6	6	
				Subtotal Actual	6	9	9	0	6	3	8	7	6	7	
				Missing	0	0	0	0	0	0	0	0	0	0	
				Percent Missing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
WR-107	GASCO	6.4	Specific Industrial	Heavy Industrial	3	4	4	NA	3	NA	4	3	3	3	11
WR-123	Schnitzer International Slip	3.7	Specific Industrial	Heavy Industrial	3	5	5	NA	3	3	4	3	2	4	3
WR-14	Chevron - Transportation	7.7	Specific Industrial	Heavy Industrial	3	5	5	NA	3	NA	5	3	3	4	17
WR-142/145	Gunderson	8.9	Specific Industrial	Heavy Industrial	1	2	2	NA	2	1	2	1	1	1	19
WR-147	Gunderson	9	Specific Industrial	Heavy Industrial	3	5	5	NA	3	3	5	2	3	4	19
WR-161	Portland Shipyard	8.2	Specific Industrial	Heavy Industrial	3	4	4	NA	3	3	4	3	3	3	21
WR-22	OSM	2.1	Specific Industrial	Heavy Industrial	3	4	4	NA	3	3	4	3	3	3	1
WR-384	Schnitzer - Riverside	3.7	Specific Industrial	Heavy Industrial	3	5	5	NA	4	NA	4	3	2	4	4
WR-4	Sulzer Pump	10.4	Specific Industrial	Heavy Industrial	3	4	4	NA	3	NA	4	3	3	3	26
WR-96	Arkema	7.3	Specific Industrial	Heavy Industrial	2	4	4	3	3	3	4	1	3	4	14
Drains to OF-17	GE Decomissioning	9.7	Specific Industrial	Heavy Industrial	1	1	1	NA	1	NA	1	0	1	1	24
				Subtotal Planned	33	33	33	3	33	18	33	33	33	33	
				Subtotal Actual	28	38	38	3	31	16	41	25	27	34	
				Missing	5	0	0	0	2	2	0	8	6	0	
				Percent Missing	15%	0%	0%	0%	6%	11%	0%	24%	18%	0%	

Status of Stormwater Outfall Composite Water Samples

Outfall(s)	Facility or Location	River Mile	Land Use Category	Land Use	AOPC Risk Drivers
OF-22	City - Willbridge Industrial Area	7.7	Land Use	Heavy Industrial	PCBs, Pesticides
OF-22B	City - Doane Lake Industrial Area	6.9	Land Use	Heavy Industrial	Pesticides, PCBs, Metals, Phthalates
OF-16	City - Heavy Industrial	9.7	Land Use	Heavy Industrial	PCBs
WR-218	UPRR Albina	10	Land Use	Heavy Industrial	PCBs
WR-67	Siltronic	6.6	Land Use	Heavy Industrial	PAHs, Pesticides, PCBs,
WR-183	Basin R Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	PCBs, PAHs, Metals
WR-181	Basin Q Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	PCBs, PAHs, Metals
WR-177	Basin M Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	PCBs, PAHs, Metals
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Land Use	Heavy Industrial	PCBs, PAHs, Metals
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
OF-M1	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	PCBs
OF-M2	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	PCBs
OF-52C	City - Terminal 4 Area	4.3	Land Use	Light Industrial	PCBs, PAHs, Metals
WR-169	Basin D Terminal 4 (Toyota)	4.7	Land Use	Light Industrial	PCBs, PAHs, Metals
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
SJB	Highway drainage	5.8		Major Transportation	
			Land Use		None
Hwy 30*	Hwy 30*	TBD	Land Use	Major Transportation*	PCBs, Pesticides, Metals, Phthalates, PAHs
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
OF-22C	City - Forest Park Area	6.9	Land Use	Open Space (Forest Park)	Pesticides, PCBs, Metals, Phthalates
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
OF-49	City - St. Johns Area	6.5	Land Use	Residential	None
OF-53	City - Residential above T4	5.1	Land Use	Residential	PCBs, PAHs, Metals
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
OF-18	City - Multiple Land Uses	9.7	Multiple Land Use	Open Space/Heavy Ind.	PCBs, Pesticides, Metals, Phthalates, PAHs
OF-19	City - Multiple Land Uses	8.4	Multiple Land Use	Open Space/Heavy Ind.	PCBs
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	
WR-107	GASCO	6.4	Specific Industrial	Heavy Industrial	PAHs, Pesticides, PCBs,
WR-123	Schnitzer International Slip	3.7	Specific Industrial	Heavy Industrial	PCBs, Phthalates, PAHs, Pesticides, Metals
WR-14	Chevron - Transportation	7.7	Specific Industrial	Heavy Industrial	PCBs, Pesticides
WR-142/145	Gunderson	8.9	Specific Industrial	Heavy Industrial	PCBs, Pesticides, Metals, Phthalates, PAHs
WR-147	Gunderson	9	Specific Industrial	Heavy Industrial	PCBs, Pesticides, Metals, Phthalates, PAHs
WR-161	Portland Shipyard	8.2	Specific Industrial	Heavy Industrial	PCBs, Metals, Phthalates, PAHs
WR-22	OSM	2.1	Specific Industrial	Heavy Industrial	Phthalates, PBCs, Metals
WR-384	Schnitzer - Riverside	3.7	Specific Industrial	Heavy Industrial	PCBs
WR-4	Sulzer Pump	10.4	Specific Industrial	Heavy Industrial	PCBs
WR-96	Arkema	7.3	Specific Industrial	Heavy Industrial	Pesticides, PCBs, Metals, Phthalates
Drains to OF-17	GE Decomissioning	9.7	Specific Industrial	Heavy Industrial	PCBs
				Subtotal Planned	
				Subtotal Actual	
				Missing	
				Percent Missing	

Status of Sediment Trap Samples - Showing Target Detection Limit Factors for LWG Sites and Estimated for T4 Sites*

Outfall(s)	Facility or Location	River Mile	Land Use Category	Land Use	PCB Congeners	Percent Solids	TOC	Organochlorine pesticides	PAHs	Phthalates	Metals	Herbicides	Grain size
OF-22	City - Willbridge Industrial Area	7.7	Land Use	Heavy Industrial	1.3	1	1						
OF-22B	City - Doane Lake Industrial Area	6.9	Land Use	Heavy Industrial	1.5	1	1						
OF-16	City - Heavy Industrial	9.7	Land Use	Heavy Industrial	1	1	1	1	1.2	1.2			
WR-218	UPRR Albina	10	Land Use	Heavy Industrial	1.9	1	1						
WR-67	Siltronic	6.6	Land Use	Heavy Industrial	1	1	1	4.8					
WR-183	Basin R Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial									
WR-181	Basin Q Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial									
WR-177	Basin M Terminal 4 Slip 1	4.3	Land Use	Heavy Industrial	1	1	1	1	1	1	1		
WR-20	Basin L Terminal 4 Wheeler Bay	4.5	Land Use	Heavy Industrial	1	1	1	1	1	1	1		
				Subtotal Planned	9	9	9	9	9	9	8	9	9
				Subtotal Actual	7	7	7	4	3	3	2	0	0
				Missing	2	2	2	5	6	6	6	9	9
				Percent Missing	22%	22%	22%	56%	67%	67%	75%	100%	100%
OF-M1	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	1	1	1	1	1.6	1.6			
OF-M2	City - Mocks Bottom Industrial Area	Lagoon	Land Use	Light Industrial	1	1	1	1	1.6	1.6			
OF-52C	City - Terminal 4 Area	4.3	Land Use	Light Industrial	1	1	1	1	1	1	1		
WR-169	Basin D Terminal 4 (Toyota)	4.7	Land Use	Light Industrial	1	1	1	1					
				Subtotal Planned	4	4	4	4	4	4	4	4	4
				Subtotal Actual	4	4	4	4	3	3	1	0	0
				Missing	0	0	0	0	1	1	3	4	4
				Percent Missing	0%	0%	0%	0%	25%	25%	75%	100%	100%
St. Johns Bridge	Highway drainage	5.8	Land Use	Major Transportation	1	1	1	1	2.4	2.4			
Hwy 30**	Hwy 30**	TBD	Land Use	Major Transportation**	1.8	1	1						
				Subtotal Planned	2	2	2	2	2	2	2	2	2
				Subtotal Actual	2	2	2	1	1	1	0	0	0
				Missing	0	0	0	1	1	1	2	2	2
				Percent Missing	0%	0%	0%	50%	50%	50%	100%	100%	100%
OF-22C	City - Forest Park Area	6.9	Land Use	Open Space (Forest Park)	1	1	1	1	1	1	1	1	
				Subtotal Planned	1	1	1	1	1	1	1	1	1
				Subtotal Actual	1	1	1	1	1	1	1	1	0
				Missing	0	0	0	0	0	0	0	0	1
				Percent Missing	0%	0%	0%	0%	0%	0%	0%	0%	100%
OF-49	City - St. Johns Area	6.5	Land Use	Residential		1	1	22.2					
OF-53	City - Residential above T4	5.1	Land Use	Residential	1	1	1	1	1	1	1		
				Subtotal Planned	2	2	2	2	2	2	2	2	2
				Subtotal Actual	1	2	2	2	1	1	1	0	0
				Missing	1	0	0	0	1	1	1	2	2
				Percent Missing	50%	0%	0%	0%	50%	50%	50%	100%	100%
OF-18	City - Multiple Land Uses	9.7	Multiple Land Use	Open Space/Heavy Industrial	1	1	1	1	1.1	1.1			
OF-19	City - Multiple Land Uses	8.4	Multiple Land Use	Open Space/Heavy Industrial	1	1	1	1	1	1	1	1	
				Subtotal Planned	2	2	2	2	2	2	2	2	2
				Subtotal Actual	2	2	2	2	2	2	1	1	0
				Missing	0	0	0	0	0	0	1	1	2
				Percent Missing	0%	0%	0%	0%	0%	0%	50%	50%	100%
WR-107	GASCO	6.4	Specific Industrial	Heavy Industrial	1	1	1	1	1	1	1	1	
WR-123	Schnitzer International Slip	3.7	Specific Industrial	Heavy Industrial	1	1	1	1					
WR-14	Chevron - Transportation	7.7	Specific Industrial	Heavy Industrial	1	1	1	1					
WR-145	Gunderson	8.9	Specific Industrial	Heavy Industrial	6	1	1						
WR-147/148	Gunderson	9	Specific Industrial	Heavy Industrial	1	1	1	5.3					
WR-161	Portland Shipyard	8.2	Specific Industrial	Heavy Industrial	1	1	1	4					
WR-22	OSM	2.1	Specific Industrial	Heavy Industrial	1	1	1	1	1	1	1	1.3	
WR-384	Schnitzer - Riverside	3.7	Specific Industrial	Heavy Industrial	1	1	1	1	1	1	1	1	
WR-4	Sulzer Pump	10.4	Specific Industrial	Heavy Industrial	3.3	1	1						
WR-96	Arkema	7.3	Specific Industrial	Heavy Industrial									
GE (drains to OF-17)	GE Decomissioning	9.7	Specific Industrial	Heavy Industrial	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Subtotal Planned	10	10	10	10	10	10	10	10	10
				Subtotal Actual	9	9	9	7	3	3	3	3	0
				Missing	1	1	1	3	7	7	7	7	10
				Percent Missing	10%	10%	10%	30%	70%	70%	70%	70%	100%

*Detection limit factor shows how the target detection limit (DL) will be exceeded with the sample mass remaining. A factor of 1 means the target detection limit will be achieved. A factor of 2 means the actual DL will be two times higher than the target DL.

NA - Indicates that samples for this analyte were not planned on being collected for this site. Blanks indicate that samples were planned but none were sucessfully completed.

**These samples were collected at a junction location that likely includes contributions from non-highway drainage area and may not be fully representative of exclusively major transportation runoff.

Percent Complete of Stormwater and Sediment Trap Samples By Land Use Category

Land Use Category	Land Use	PCB Congeners		Solids		Organic Carbon		Pesticides		PAHs		Phthalates		Metals		Herbicides	
		Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment
Land Use	Heavy Industrial	93%	78%	100%	78%	100%	78%	100%	44%	93%	33%	NA	33%	100%	25%	44%	0%
Land Use	Light Industrial	83%	100%	100%	100%	100%	100%	100%	100%	100%	75%	89%	75%	100%	25%	100%	0%
Land Use	Major Transportation	67%	100%	100%	100%	100%	100%	NA	50%	100%	50%	100%	50%	100%	0%	83%	0%
Land Use	Open Space (Forest Park)	67%	100%	67%	100%	67%	100%	NA	100%	67%	100%	67%	100%	67%	100%	67%	100%
Land Use	Residential	83%	50%	100%	100%	100%	100%	100%	100%	100%	50%	83%	50%	83%	50%	67%	0%
Multiple Land Use	Open Space/Heavy Industrial	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	50%	100%	50%
Specific Industrial	Heavy Industrial	85%	90%	100%	90%	100%	90%	100%	70%	94%	30%	89%	30%	100%	30%	76%	30%

100-76% complete
75%-51% complete
50-26% complete
25-0% complete

Sediment analyses at **less than half** the stations have increased detection limits due to insufficient sample volume.

Sediment analyses at **half or more** the stations have increased detection limits due to insufficient sample volume.

September 20, 2007 Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

From: Scheffler, Linda [LindaSC@BES.CI.PORTLAND.OR.US]
Sent: Thu 9/20/2007 5:03 PM
To: Carl Stivers; Koch.Kristine@epamail.epa.gov; Scheffler, Linda; Amanda Spencer; Andy Koulermos; Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole; TARNOW Karen E
Cc: Christine Hawley; Gene Revelas; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: RE: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

Carl,

Was there a table or something that should have been attached that summarized the additional monitoring that we are recommending? To chime in on the meeting notes and rationale for additional work, I didn't quite understand the asterisk comment in the meeting notes. I don't recall the conclusion that additional data collection needs would be derived from detects vs. non-detects but rather from whether a given site was unique or non-unique and how complete the existing stormwater data set is for each site.

With the heavy industrial sites, we were thinking that for the locations identified in the FSP as unique, a full set of stormwater samples may justify not going back just to fill gaps in the respective stormwater solids samples. But for those unique sites where the stormwater data set is incomplete, additional stormwater sampling would be recommended to have three data points due to the inherent variability in stormwater, statistical analysis, and the potential for the site to be unique. If additional stormwater monitoring work was recommended at a site with incomplete sediment trap data, then it seems logical to redeploy the sediment trap as well. There was also a discussion about the value of collecting solids data at the unique industrial sites, even if there is a full stormwater data set.

For heavy industrial sites in the general land use category, the discussion keyed on a couple of sites (UPRR and OF 22B) that may turn out to be unique once the stormwater data is evaluated in the context of the other general land use sites. For this reason, a robust stormwater data set at these sites may be more important than a full set at the other heavy industrial locations within this category. Additional sediment trap work that we discussed focused on the specific industrial sites and other land use categories. We spent time identifying additional monitoring needed in the other land use categories that was not summarized in the notes. It may be that we are mixing the need to have a better sense of what the stormwater data looks like with the rationale we utilized for determining where further data collection may be warranted.

Linda

From: Carl Stivers [mailto:cstivers@anchorenv.com]
Sent: Tuesday, September 18, 2007 11:07 AM
To: Koch.Kristine@epamail.epa.gov; Scheffler, Linda; Amanda Spencer; Andy Koulermos;

Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole; TARNOW Karen E
Cc: Christine Hawley; Gene Revelas; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

Stormwater Technical Team -

As promised, here are the highlights and path forward from the last call. Please let me know if I missed anything. If so, please respond to all with comments and we will revise as agreed by the group. Once we all agree on this summary, Anchor will submit to the LWG Managers for official consideration.

Based on time to complete the data analyses discussed below and obtain LWG approval to release that analysis, I suggest our next call take place on the week of October 15. Please provide me with your available times in that week. I am pretty available except the morning of the Oct 16 (Tues.) and Oct 19 (Fri.) after 11 am. (Laura - Please let us all know if this timeframe seems too ambitious for us to crunch all these numbers.)

The team discussed data gaps and data needs and the following proposal for additional sampling in the fall emerged:

*If existing data indicates analytes are substantially detected in available storms, a load could be estimated from this and additional data may be less necessary.

The team is officially requesting that the LWG consider collecting such data this fall.

While this is under consideration, the team will start discussions of how data will be used to develop stormwater loads, as described by the FSP rationale. To facilitate these discussions it was agreed that the LWG consultants should put together some summaries of existing stormwater data (which we have in hand now). The LWG consultants will consider what types of data summaries might be most useful but will likely include items such as:

Graphs of distributions of chemical and TSS concentration data

Summary statistics tables of detections and concentrations

The LWG consultants may provide some additional types of summaries based on an analysis of potential methods for obtaining loading rates. In addition, the consultants will prepare a brief summary of the suggested range of methods that might be employed for calculating loading rates.

Finally, the Stormwater Technical Team requested a copy of the stormwater Field Sampling Report (FSR) to help in interpretation of the data. The FSR will be under internal LWG review most likely next week and once through that process will be submitted to EPA for general use.

Thanks.

Carl

Carl Stivers
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cstivers@anchorenv.com

September 20, 2007 Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

From: Carl Stivers
Sent: Thu 9/20/2007 5:29 PM
To: 'Scheffler, Linda'; Koch.Kristine@epamail.epa.gov; Amanda Spencer; Andy Koulermos; Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole; TARNOW Karen E
Cc: Christine Hawley; Gene Revelas; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: RE: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

All –

OK it appears the nifty table I embedded in the text of the email was a bad idea, since it seems to have been scoured out by some email systems.

So here is the email again, with the supporting table as an Excel attachment. Hopefully, this works better.

Stormwater Technical Team -

As promised, here are the highlights and path forward from the last call. Please let me know if I missed anything. If so, please respond to all with comments and we will revise as agreed by the group. Once we all agree on this summary, Anchor will submit to the LWG Managers for official consideration.

Based on time to complete the data analyses discussed below and obtain LWG approval to release that analysis, I suggest our next call take place on the week of October 15. Please provide me with your available times in that week. I am pretty available except the morning of the Oct 16 (Tues.) and Oct 19 (Fri.) after 11 am. (Laura - Please let us all know if this timeframe seems too ambitious for us to crunch all these numbers.)

The team discussed data gaps and data needs and the proposal for additional sampling in the fall is shown in the attached table.

The team is officially requesting that the LWG consider collecting such data this fall.

While this is under consideration, the team will start discussions of how data will be used to develop stormwater loads, as described by the FSP rationale. To facilitate these discussions it was agreed that the LWG consultants should put together some summaries of existing stormwater data (which we have in hand now). The LWG consultants will consider what types of data summaries might be most useful but will likely include items such as:

- Graphs of distributions of chemical and TSS concentration data

- Summary statistics tables of detections and concentrations

The LWG consultants may provide some additional types of summaries based on an analysis of potential methods for obtaining loading rates. In addition, the consultants will prepare a brief summary of the suggested range of methods that might be employed for calculating loading rates.

Finally, the Stormwater Technical Team requested a copy of the stormwater Field Sampling Report (FSR) to help in interpretation of the data. The FSR will be under internal LWG review most likely next week and once through that process will be submitted to EPA for general use.

Thanks.

Carl

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cstivers@anchorenv.com

No.	Station	Stormwater Events	Sediment Trap	Rationale	Other Notes
1	OF-22C	1		Only one open space station, and it is currently not complete for stormwater	
2	Hwy 30	3	1	Location inadvertantly included industrial drainage--not applicable to transportation	
3	OF-22B	1	1	Could be unique site for pesticides or PCBs and missing a storm for both and pesticides in sediments	Prioritize sediment traps for missing analytes (starting with pesticides)
4	OF-49	1	1	Only two residential sites and this one missing a storm for some analytes and almost all sediment analytes	Need all analytes in sediments
5	OF-18		1	Only one of two multiple land use sites and missing metals in sediment	Prioritize sediment traps for missing analytes (starting with metals)
6	WR-145	1	1	Only 1 storm for PCBs and missing almost all sediment analytes	Need all analytes in sediments
7	WR-96	1	1	Missing one storm for PCBs and two for herbicides and sediment traps missing all analytes	Review existing stormwater data to see if another stormwater event actually needed.*
8	WR-14		1	Missing most analytes in sediment	Review existing stormwater data to see if sediment data actually needed.* Prioritize traps for missing analytes.
9	WR-4		1	Missing most analytes in sediment	Review existing stormwater data to see if sediment data actually needed.* Prioritize traps for missing analytes.
10	WR-161		1	Missing most analytes in sediment	Review existing stormwater data to see if sediment data actually needed.* Prioritize traps for missing analytes.
11	WR-123		1	Missing most analytes in sediment	Review existing stormwater data to see if sediment data actually needed.* Prioritize traps for missing analytes.
12	WR-147/8		1	Missing most analytes in sediment	Review existing stormwater data to see if sediment data actually needed.* Prioritize traps for missing analytes.
13	WR-218	1	1	Could be unique site for some chemicals and missing a storm and most sediment analytes	Prioritize sediment traps for missing analytes
Totals		9	12		
Total minus*		8	6	Excluding those samples that are contingent on data analysis (indicated by *)	

*If existing data indicates analytes are substantially detected in available storms, a load could be estimated from this and additional data may be less necessary.

September 21, 2007 Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

From: Koch.Kristine@epamail.epa.gov
Sent: Fri 9/21/2007 9:01 AM
To: Carl Stivers
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; MCCLINCY Matt; mcoover@ensr.aecom.com; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

Carl - First, I'm currently available that week, except 10/17 (9-11) and 10/18 (1:30-2).

Secondly, you did not provide a table or listing of the proposed sampling so that may be where Karen's comment came from. Your statement makes it appear that there are no data gaps and I think it would be helpful for others to see the initial list to grasp the magnitude of this. I really thought our last meeting was going to have more discussion involving the analyzed data. I had provided my list of data gaps earlier, and it seems that the last conference call didn't put us much further ahead. I had identified several data gaps just based on sampling, but agreed that if the data analysis could show that any of these data gaps were filled, then additional sampling would not be necessary. Additionally, the data analysis could show that more sampling is necessary in other areas. I think that it is imperative to look at the data soon and confirm the data gaps by the next meeting to ensure that there is time to get into the field and collect the information to fill the data gaps this fall.

Kristine Koch
Remedial Project Manager
USEPA, Office of Environmental Cleanup

U. S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900, M/S ECL-115 Seattle, Washington 98101-3140

(206)553-6705
(206)553-0124 (fax)
1-800-424-4372 extension 6705 (M-F, 8-4 Pacific Time, only)

"Carl Stivers" <cstivers@anchorenv.com> 09/20/2007 03:06 PM

To "TARNOW Karen E" <TARNOW.Karen@deq.state.or.us>, Kristine Koch/R10/USEPA/US@EPA, "Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US>, "Amanda Spencer"

<aspencer@ashcreekassociates.com>
, "Andy Koulermos"
<akoulermos@newfields.com>,
"Laura Jones"
<ljones@integral-corp.com>,
"Amanda Shellenberger"
<ashellenberger@anchorenv.com>,
"Sanders, Dawn"
<DAWNS@BES.CI.PORTLAND.OR.US>,
"LaFranchise, Nicole"
<Nicole.LaFranchise@portofportlan
d.com>

cc

"Christine Hawley"
<chawley@integral-corp.com>,
"Gene Revelas"
<grevelas@integral-corp.com>,
"Jim McKenna"
<Jim.McKenna@portofportland.com>,
"Jessica Pisano"
<jpisano@anchorenv.com>, "Rick
Applegate"
<RICKA@bes.ci.portland.or.us>,
"Bob Wyatt" <rjw@nwnatural.com>,
<mcoover@ensr.aecom.com>,
"MCCLINCY Matt"
<MCCLINCY.Matt@deq.state.or.us>,
"Jessica Pisano"
<jpisano@anchorenv.com>

Subject

RE: Notes from Stormwater Tech
Team Call Sept 14th at 1:15pm

Karen –

I am not entirely clear on how your comment would impact the proposed list of samples. Which summary statement specifically, are you referring to? Is it the table of samples itself?

If Kristine can provide something that specifically edits the proposed list of samples, that might be the quickest clarification.

Either way, it would be good if we could turn your comment into specific edits to the table, so that we know the numbers and types of sampling locations under consideration.

Thanks much.

Carl

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Wenatchee, WA 98801
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Fax: 509-888-2211
cstivers@anchorenv.com

From: TARNOW Karen E [mailto:TARNOW.Karen@deq.state.or.us]
Sent: Thursday, September 20, 2007 10:20 AM
To: Carl Stivers; Koch.Kristine@epamail.epa.gov; Scheffler, Linda; Amanda Spencer; Andy Koulermos; Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole
Cc: Christine Hawley; Gene Revelas; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: RE: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

Carl -

This is just a quick note to let you know that I don't agree with your summary statement of last week's conference call.

Rather, I thought we discussed the need to fill the data gaps at a number of sites regardless of what the existing data sets for those sites looked like, and that the discussions about evaluating existing data sets only potentially applied to a small number of sites (e.g., a non-unique site that belongs to a land use category for which there is already a robust data set).

If you don't have notes on the additional data needs for specific sites that we discussed on the conference call, I am hoping that Kristine can provide that list. It was a bit too unwieldy to track the detailed conversation over the phone and I expected that such a list would be sent out with the meeting summary so we could all review it individually and provide our input.

If this seems off base, please let me know. It's not hard to misconstrue things when you're talking to a bunch of people in cyberspace for 2 1/2 hours!

Karen

-----Original Message-----
From: Carl Stivers [mailto:cstivers@anchorenv.com]
Sent: Tuesday, September 18, 2007 11:07 AM
To: Koch.Kristine@epamail.epa.gov; Scheffler, Linda; Amanda Spencer; Andy Koulermos; Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole; TARNOW Karen E
Cc: Christine Hawley; Gene Revelas; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

Stormwater Technical Team –

As promised, here are the highlights and path forward from the last call. Please let me know if I missed anything. If so, please respond to all with comments and we will revise as agreed by the group. Once we all agree on this summary, Anchor will submit to the LWG Managers for official consideration.

-Remaining text deleted-

October 2, 2007 Stormwater Technical Team Call October 16 at 1:00 pm

From: Carl Stivers
Sent: Tue 10/2/2007 10:58 AM
To: 'Koch.Kristine@epamail.epa.gov'
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; MCCLINCY Matt; mcoover@ensr.aecom.com; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: Stormwater Technical Team Call October 16 at 1:00 pm

Stormwater Technical Team -

The next call is on October 16th at 1:00 pm as Amanda Shellenberger previously noted. The call in number will be Non-Responsive Jessica - Please confirm to me that this number is OK for this time.)

I also wanted to mention that the LWG has been discussing the scheduling of the additional stormwater work currently under consideration. Basically, the work would need to be completed by Dec. 31, 2007 in order for the overall RI/FS project to stay on schedule. Given Kristine's comments (copied below) regarding potential for more data needs based on review of the stormwater detect/concentration data, it is imperative that we make any final decisions on the complete set of data needs at this next call. From that point, I would envision the following schedule:

- Obtain official LWG approval/disapproval between Oct. 16 and October 31.
- Formalize proposal in a technical memo from Oct. 16 to October 31, with EPA approval to proceed on October 31. (Note that this memo would heavily reference the existing FSP and would only note those new items necessary to execute this additional proposed work.)
- Deploy sediment traps from Nov. 1 through Dec. 31
- Be on alert for storm events from Nov. 1 through Dec. 31 and collect storms as possible per the FSP requirements.

Note that LWG consultants are working on a stormwater data detect/concentration summary consistent with the last meetings discussion and plan to get that to the Stormwater Technical team by October 11th after LWG approval on October 10th. The field sampling report is also under preparation, and is due to EPA in mid-October. I think it is unlikely that EPA/DEQ would have this report in hand prior to the October 16th call. However, I don't think this report will have much direct impact on our decisions as compared to the stormwater data summaries.

In the meantime, please let me know if you have any other questions.

Thanks.

Carl

Carl Stivers

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cstivers@anchorenv.com

October 10, 2007 Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

From: Scheffler, Linda [mailto:LindaSC@BES.CI.PORTLAND.OR.US]
Sent: Wed 10/10/2007 11:09 AM
To: Carl Stivers; Scheffler, Linda; Koch.Kristine@epamail.epa.gov; Amanda Spencer; Andy Koulermos; Laura Jones; Amanda Shellenberger; Sanders, Dawn; LaFranchise, Nicole; TARNOW Karen E
Subject: RE: Notes from Stormwater Tech Team Call Sept 14th at 1:15pm

In preparation for our tech call on the 16th, the City offers the following comments on the summary table and path forward for Stormwater Data Gaps discussion:

General Comments:

- Schedule -- in consideration of the RI/FS schedule, ideally additional sample collection will be completed by the end of the year. However, if extending the equipment deployments into the early part of next year would significantly increase the likelihood of obtaining adequate sample volumes to meet objectives, the approved plan should allow for the consideration of a longer deployment. Our previous deployment period represented the tail end of the wet season -- we may find that sediment traps accumulate larger volumes of solids during the fall and early winter months.
- For sites where there is consensus that additional data collection is necessary, the process of securing new access agreements should be initiated to expedite equipment redeployment.
- The table represents additional work requested of the LWG by the tech team. The FSP includes 8 additional sites (7 monitored by the Port and 1 by GE). Additional data will be collected from these sites this fall and data are intended to be utilized in the LWG stormwater evaluation. Because our tech discussion centers on the full data set, the table should be expanded to summarize the what additional data will be collected at these sites. If either the Port or GE does not plan on collecting data needed to meet FSP objectives, the LWG should consider data collection at those sites as well.
- For five locations, we have discussed reviewing existing stormwater data to determine if additional sediment trap data should be collected, but we have not established a decision process to make this determination. Team members should think about what those decision criteria might look like in advance of the meeting. If stormwater concentrations are low for a particular analyte, would we collect sediment to verify that the storm samples didn't miss something? Or if stormwater concentrations are high, would we collect sediment to confirm that the loading is represented correctly?

Specific Comments:

- In our last call we agreed to consider adding an additional Major Transportation land use site, as the SJB location may not be representative. This should be included as a potential monitoring station on the table.

- WR-142/145 (Gunderson) only has one storm event for PCBs and phthalates. Since PCBs have been identified in the sediment and are a site COI, shouldn't an additional two stormwater samples be collected? The table proposes one additional storm event.
- WR-96 (Arkema) is slated for sediment trap deployment -- collection of the third storm event would not represent significant extra effort and would provide a more robust data set for that site given the inherent variability in stormwater data.

Let us know if you need any clarification of these comments.

Linda Scheffler
City of Portland
Bureau of Environmental Services
(503) 823-2296

October 12, 2007 Stormwater Technical Team Call October 16 at 1:00 pm

From: Carl Stivers
Sent: Fri 10/12/2007 10:02 AM
To: 'Koch.Kristine@epamail.epa.gov'; 'Andy Koulermos'; Amanda Shellenberger; 'Amanda Spencer'; 'Sanders, Dawn'; 'Scheffler, Linda'; 'Laura Jones'; 'mcoover@ensr.aecom.com'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: Bob Wyatt; Rick Applegate; 'MCCLINCY Matt'; Jessica Pisano; 'Gene Revelas'; 'Christine Hawley'; Jim McKenna
Subject: RE: Stormwater Technical Team Call October 16 at 1:00 pm

Stormwater Technical Team –

Attached are some data summaries to facilitate our next call. In addition, there is a summary of loading estimate calculation method options that was also requested by the team. My suggestion for an agenda based email traffic since our last meeting is:

- Finalize recommendations for fall stormwater/sediment trap sampling
  - Review data summaries
  - Discuss work anticipated at GE and T4 sites and how that fits in
  - Decide on any changes to recommendations
- Discuss path forward to seek approvals and schedule for implementation
- Discuss stormwater loading calculation methods (if time allows)
- Determine next meeting time and content

Also, note that we are planning on providing one additional data table that may be helpful to the group, but that will likely not be available until late today or Monday.

Thanks.

Carl

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cstivers@anchorenv.com

From: Carl Stivers
Sent: Tuesday, October 02, 2007 10:58 AM
To: 'Koch.Kristine@epamail.epa.gov'
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; MCCLINCY Matt; mcoover@ensr.aecom.com; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: Stormwater Technical Team Call October 16 at 1:00 pm

Stormwater Technical Team -

The next call is on October 16th at 1:00 pm as Amanda Shellenberger previously noted. The call in number will be Non-Responsive (Jessica - Please confirm to me that this number is OK for this time.)

-Remaining text deleted-

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]											
	Total PCBs	Open Space (Forest Park)	OF22C	2	1	50	53.5	53.5	26.2	80.8	pg/L
		Residential	OF49	2	0	100	1180	1180	1140	1220	pg/L
		Major Transportation	H30	1	0	100	17500	17500	17500	17500	pg/L
			SJB	4	0	100	86300	75900	8500	185000	pg/L
		Open Space/Heavy Ind.	OF18	4	0	100	178000	99200	12300	503000	pg/L
			OF19	3	0	100	34600	25000	11100	67700	pg/L
		Light Industrial	OFM1	3	0	100	10110	9040	3490	17800	pg/L
			OFM2	4	0	100	8960	7520	1700	19100	pg/L
		Heavy Industrial	OF16	3	0	100	146000	117000	88500	232000	pg/L
			OF22	4	0	100	24295	23100	9380	41600	pg/L
			OF22B	3	0	100	138000	143000	27800	244000	pg/L
			WR218	2	0	100	34850	34900	17600	52100	pg/L
			WR67	4	0	100	1689	732	344	4950	pg/L
		Arkema	WR96	3	0	100	12250	8340	8210	20200	pg/L
		Chevron - Transportation	WR14	3	0	100	5697	5520	971	10600	pg/L
		GASCO	WR107	4	0	100	2495	2525	510	4420	pg/L
		Gunderson	WR142	2	0	100	1226	1226	852	1600	pg/L
			WR147	3	0	100	658000	428000	237000	1310000	pg/L
		OSM	WR22	4	0	100	278000	272000	243000	325000	pg/L
		Portland Shipyard	WR161	5	0	100	125000	119000	1400	302000	pg/L
		Schnitzer - Riverside	WR384	4	0	100	5125000	4400000	100000	11600000	pg/L
		Schnitzer International Slip	WR123	4	0	100	277000	256000	56700	539000	pg/L
		Sulzer Pump	WR4	3	0	100	8593	4860	4820	16100	pg/L
	Total suspended solids	Open Space (Forest Park)	OF22C	2	0	100	10.0	10.0	10.0	10.0	mg/L
		Residential	OF49	3	0	100	20.7	16.0	8.0	38.0	mg/L
		Major Transportation	H30	3	0	100	46.7	47.0	33.0	60.0	mg/L
			SJB	7	0	100	112	85.0	13.0	248	mg/L
		Open Space/Heavy Ind.	OF18	5	0	100	115	113	17.0	212	mg/L
			OF19	5	0	100	103	81.0	34.0	191	mg/L
		Light Industrial	OFM1	4	0	100	67.0	62.5	46.0	97.0	mg/L
			OFM2	4	0	100	51.3	46.5	31.0	81.0	mg/L
		Heavy Industrial	OF16	5	0	100	89.4	78.0	34.0	171	mg/L
			OF22	4	0	100	176	143	69.0	351	mg/L
			OF22B	3	0	100	220	229	164	266	mg/L
			WR218	2	0	100	52.5	52.5	28.0	77.0	mg/L
			WR67	6	0	100	27.5	18.5	6.0	59.0	mg/L
		Arkema	WR96	5	0	100	12.0	11.0	5.0	20.0	mg/L
		Chevron - Transportation	WR14	5	0	100	38.4	42.0	12.0	51.0	mg/L
		GASCO	WR107	5	0	100	24.0	26.0	10.0	36.0	mg/L
		Gunderson	WR142	2	0	100	11.5	11.5	8.0	15.0	mg/L
			WR145	1	0	100	9.0	9.0	9.0	9.0	mg/L
			WR147	5	0	100	48.2	28.0	15.0	119	mg/L
		OSM	WR22	5	0	100	208	146	128	401	mg/L
		Portland Shipyard	WR161	6	0	100	80.3	39.5	8.0	256	mg/L
		Schnitzer - Riverside	WR384	5	0	100	264	167	6.0	780	mg/L
		Schnitzer International Slip	WR123	6	0	100	231	230	58.0	414	mg/L
		Sulzer Pump	WR4	4	0	100	14.0	13.5	5.0	24.0	mg/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]											
	Total organic carbon	Open Space (Forest Park)	OF22C	2	0	100	3.1	3.1	2.8	3.3	mg/L
		Residential	OF49	3	0	100	9.4	6.8	5.7	15.6	mg/L
		Major Transportation	H30	3	0	100	19.9	15.7	13.5	30.6	mg/L
			SJB	7	0	100	21.9	22.3	3.9	39.5	mg/L
		Open Space/Heavy Ind.	OF18	5	0	100	10.1	7.8	4.3	19.0	mg/L
			OF19	5	0	100	6.4	5.9	4.1	10.1	mg/L
		Light Industrial	OFM1	4	0	100	11.1	12.1	6.1	14.1	mg/L
			OFM2	4	0	100	6.7	5.8	3.2	11.8	mg/L
		Heavy Industrial	OF16	4	0	100	10.3	8.4	6.7	17.5	mg/L
			OF22	4	0	100	22.8	12.1	7.1	60.0	mg/L
			OF22B	3	0	100	26.0	28.3	14.1	35.6	mg/L
			WR218	2	0	100	14.3	14.3	7.1	21.5	mg/L
			WR67	6	0	100	9.2	8.7	4.3	15.4	mg/L
		Arkema	WR96	5	0	100	11.4	7.5	4.5	30.8	mg/L
		Chevron - Transportation	WR14	5	0	100	10.3	6.4	4.1	23.6	mg/L
		GASCO	WR107	5	0	100	4.2	4.2	2.9	5.6	mg/L
		Gunderson	WR142	2	0	100	17.4	17.4	12.0	22.7	mg/L
			WR145	1	0	100	8.1	8.1	8.1	8.1	mg/L
			WR147	5	0	100	15.2	11.7	5.5	38.6	mg/L
		OSM	WR22	5	0	100	5.8	6.0	3.2	8.2	mg/L
		Portland Shipyard	WR161	6	0	100	50.1	13.8	4.1	144	mg/L
		Schnitzer - Riverside	WR384	5	0	100	27.2	23.7	21.7	42.3	mg/L
		Schnitzer International Slip	WR123	6	0	100	14.6	13.1	8.8	27.5	mg/L
		Sulzer Pump	WR4	4	0	100	6.2	5.2	2.9	11.4	mg/L
	Total of 2,4' and 4,4'-DDD, -DDE, -DDT	Heavy Industrial	OF22B	3	0	100	97.7	71.0	12.0	210	mg/L
		Arkema	WR96	4	0	100	4300	2650	900	11000	ng/L
	Low Molecular Weight PAH	Open Space (Forest Park)	OF22C	2	2	0	0.0080	0.0080	0.0075	0.0085	ng/L
		Residential	OF49	3	1	67	0.017	0.019	0.0095	0.021	ug/L
		Major Transportation	H30	3	0	100	0.099	0.076	0.071	0.15	ug/L
			SJB	4	0	100	1.4	0.67	0.31	4.1	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.16	0.072	0.0084	0.47	ug/L
			OF19	3	0	100	0.15	0.15	0.100	0.19	ug/L
		Light Industrial	OFM1	3	0	100	0.33	0.32	0.20	0.46	ug/L
			OFM2	4	0	100	0.086	0.086	0.053	0.12	ug/L
		Heavy Industrial	OF16	3	0	100	0.32	0.31	0.20	0.44	ug/L
			OF22	4	0	100	0.82	0.17	0.040	2.9	ug/L
			OF22B	3	0	100	1.8	0.59	0.51	4.3	ug/L
			WR218	2	0	100	0.12	0.12	0.097	0.14	ug/L
			WR67	4	0	100	0.099	0.085	0.067	0.16	ug/L
		Arkema	WR96	4	0	100	0.013	0.013	0.0067	0.018	ug/L
		Chevron - Transportation	WR14	3	0	100	0.44	0.45	0.19	0.69	ug/L
		GASCO	WR107	4	0	100	0.85	0.46	0.20	2.3	ug/L
		Gunderson	WR142	2	1	50	0.091	0.091	0.0025	0.18	ug/L
			WR145	1	0	100	0.20	0.20	0.20	0.20	ug/L
			WR147	3	0	100	0.17	0.21	0.092	0.22	ug/L
		OSM	WR22	4	0	100	0.30	0.19	0.13	0.68	ug/L
		Portland Shipyard	WR161	5	0	100	0.17	0.21	0.042	0.22	ug/L
		Schnitzer - Riverside	WR384	3	1	67	1.08	1.4	0.046	1.8	ug/L
		Schnitzer International Slip	WR123	4	0	100	0.25	0.16	0.062	0.64	ug/L
		Sulzer Pump	WR4	3	0	100	0.087	0.087	0.087	0.087	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]											
	High Molecular Weight PAH	Open Space (Forest Park)	OF22C	2	2	0	0.0028	0.0028	0.0027	0.0028	ug/L
		Residential	OF49	3	0	100	0.075	0.071	0.055	0.100	ug/L
		Major Transportation	H30	3	0	100	0.47	0.32	0.20	0.88	ug/L
			SJB	4	0	100	3.4	2.3	0.85	8.1	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.79	0.50	0.075	2.1	ug/L
			OF19	3	0	100	0.81	0.83	0.65	0.95	ug/L
		Light Industrial	OFM1	3	0	100	1.1	1.2	0.89	1.2	ug/L
			OFM2	4	0	100	0.38	0.31	0.21	0.68	ug/L
		Heavy Industrial	OF16	3	0	100	0.58	0.69	0.28	0.78	ug/L
			OF22	4	0	100	0.96	0.88	0.48	1.6	ug/L
			OF22B	3	0	100	0.90	0.64	0.57	1.5	ug/L
			WR218	2	0	100	0.37	0.37	0.35	0.38	ug/L
			WR67	4	0	100	0.53	0.52	0.24	0.86	ug/L
		Arkema	WR96	4	0	100	0.044	0.042	0.038	0.054	ug/L
		Chevron - Transportation	WR14	3	0	100	4.7	4.7	1.2	8.1	ug/L
		GASCO	WR107	4	0	100	4.9	4.1	1.8	9.7	ug/L
		Gunderson	WR142	2	0	100	0.34	0.34	0.17	0.51	ug/L
			WR145	1	0	100	0.70	0.70	0.70	0.70	ug/L
			WR147	3	0	100	0.28	0.36	0.13	0.36	ug/L
		OSM	WR22	4	0	100	0.55	0.54	0.29	0.83	ug/L
		Portland Shipyard	WR161	5	0	100	0.47	0.53	0.076	0.90	ug/L
		Schnitzer - Riverside	WR384	3	0	100	13.5	11.0	0.35	29.0	ug/L
		Schnitzer International Slip	WR123	4	0	100	0.84	0.79	0.37	1.4	ug/L
		Sulzer Pump	WR4	3	0	100	0.16	0.12	0.056	0.31	ug/L
	Total PAHs	Open Space (Forest Park)	OF22C	2	2	0	0.0080	0.0080	0.0075	0.0085	ug/L
		Residential	OF49	3	0	100	0.089	0.092	0.074	0.100	ug/L
		Major Transportation	H30	3	0	100	0.56	0.39	0.28	1.00	ug/L
			SJB	4	0	100	4.8	2.9	1.2	12.0	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.96	0.58	0.083	2.6	ug/L
			OF19	3	0	100	0.94	0.98	0.75	1.1	ug/L
		Light Industrial	OFM1	3	0	100	1.4	1.5	1.10	1.6	ug/L
			OFM2	4	0	100	0.46	0.39	0.26	0.80	ug/L
		Heavy Industrial	OF16	3	0	100	0.90	0.98	0.71	1.00	ug/L
			OF22	4	0	100	1.8	1.04	0.52	4.5	ug/L
			OF22B	3	0	100	2.7	2.1	1.2	4.9	ug/L
			WR218	2	0	100	0.48	0.48	0.44	0.52	ug/L
			WR67	4	0	100	0.63	0.60	0.31	1.00	ug/L
		Arkema	WR96	4	0	100	0.056	0.053	0.048	0.072	ug/L
		Chevron - Transportation	WR14	3	0	100	5.1	5.1	1.4	8.8	ug/L
		GASCO	WR107	4	0	100	5.8	4.5	2.0	12.0	ug/L
		Gunderson	WR142	2	0	100	0.43	0.43	0.17	0.69	ug/L
			WR145	1	0	100	0.90	0.90	0.90	0.90	ug/L
			WR147	3	0	100	0.45	0.56	0.22	0.58	ug/L
		OSM	WR22	4	0	100	0.84	0.72	0.42	1.5	ug/L
		Portland Shipyard	WR161	5	0	100	0.64	0.71	0.12	1.1	ug/L
		Schnitzer - Riverside	WR384	3	0	100	14.1	12.0	0.35	30.0	ug/L
		Schnitzer International Slip	WR123	4	0	100	1.1	1.1	0.44	1.7	ug/L
		Sulzer Pump	WR4	3	0	100	0.25	0.21	0.14	0.40	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]											
	Arsenic	Open Space (Forest Park)	OF22C	2	0	100	0.20	0.20	0.20	0.20	ug/L
		Residential	OF49	3	0	100	0.34	0.29	0.26	0.47	ug/L
		Major Transportation	H30	3	0	100	0.50	0.49	0.49	0.53	ug/L
			SJB	4	0	100	0.88	0.86	0.82	0.98	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	1.7	1.7	1.4	1.8	ug/L
			OF19	4	0	100	1.5	1.6	0.77	2.2	ug/L
		Light Industrial	OFM1	4	0	100	0.93	0.94	0.72	1.1	ug/L
			OFM2	4	0	100	1.6	1.5	0.99	2.3	ug/L
		Heavy Industrial	OF16	5	0	100	0.63	0.71	0.34	0.79	ug/L
			OF22	3	0	100	3.3	3.6	2.4	4.0	ug/L
			OF22B	2	0	100	4.9	4.9	4.0	5.8	ug/L
			WR218	2	0	100	1.1	1.1	0.94	1.3	ug/L
			WR67	5	0	100	0.31	0.23	0.13	0.59	ug/L
		Arkema	WR96	4	0	100	17.9	17.5	16.9	19.8	ug/L
		Chevron - Transportation	WR14	5	0	100	0.51	0.54	0.27	0.71	ug/L
		GASCO	WR107	4	0	100	0.76	0.72	0.27	1.3	ug/L
		Gunderson	WR142	1	0	100	0.87	0.87	0.87	0.87	ug/L
			WR145	1	1	0	0.0035	0.0035	0.0035	0.0035	ug/L
			WR147	5	0	100	0.68	0.63	0.38	1.07	ug/L
		OSM	WR22	4	0	100	6.6	6.9	4.2	8.4	ug/L
		Portland Shipyard	WR161	4	0	100	1.5	1.5	1.10	1.8	ug/L
		Schnitzer - Riverside	WR384	4	0	100	2.0	1.9	1.5	2.9	ug/L
		Schnitzer International Slip	WR123	4	0	100	8.2	8.0	2.7	14.3	ug/L
		Sulzer Pump	WR4	4	0	100	0.29	0.27	0.21	0.42	ug/L
	Lead	Open Space (Forest Park)	OF22C	2	0	100	0.42	0.42	0.40	0.44	ug/L
		Residential	OF49	3	0	100	2.8	2.8	1.4	4.3	ug/L
		Major Transportation	H30	3	0	100	8.6	7.1	5.4	13.2	ug/L
			SJB	4	0	100	39.6	30.0	23.2	75.2	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	44.5	39.3	23.2	76.3	ug/L
			OF19	4	0	100	21.8	17.9	10.4	41.0	ug/L
		Light Industrial	OFM1	4	0	100	8.8	4.8	4.2	21.4	ug/L
			OFM2	4	0	100	4.7	3.8	2.9	8.4	ug/L
		Heavy Industrial	OF16	5	0	100	30.4	22.4	13.4	55.4	ug/L
			OF22	3	0	100	16.4	14.7	9.7	24.7	ug/L
			OF22B	2	0	100	148	148	101	195	ug/L
			WR218	2	0	100	12.6	12.6	5.7	19.5	ug/L
			WR67	5	0	100	3.4	1.7	0.62	9.3	ug/L
		Arkema	WR96	4	0	100	12.7	13.5	8.5	15.3	ug/L
		Chevron - Transportation	WR14	5	0	100	7.0	6.7	2.6	11.4	ug/L
		GASCO	WR107	4	0	100	4.9	4.5	2.8	7.8	ug/L
		Gunderson	WR142	1	0	100	1.2	1.2	1.2	1.2	ug/L
			WR145	1	0	100	7.0	7.0	7.0	7.0	ug/L
			WR147	5	0	100	63.3	34.8	14.6	143	ug/L
		OSM	WR22	4	0	100	48.3	49.0	39.1	56.1	ug/L
		Portland Shipyard	WR161	4	0	100	27.8	14.8	11.4	70.0	ug/L
		Schnitzer - Riverside	WR384	4	0	100	377	433	6.2	635	ug/L
		Schnitzer International Slip	WR123	4	0	100	41.7	38.6	17.7	71.8	ug/L
		Sulzer Pump	WR4	4	0	100	6.3	5.1	1.9	13.0	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]											
	Mercury	Open Space (Forest Park)	OF22C	2	2	0	0.015	0.015	0.015	0.015	ug/L
		Residential	OF49	3	3	0	0.015	0.015	0.015	0.015	ug/L
		Major Transportation	H30	3	2	33	0.025	0.030	0.015	0.030	ug/L
			SJB	4	3	25	0.030	0.025	0.010	0.060	ug/L
		Open Space/Heavy Ind.	OF18	4	1	75	0.035	0.040	0.020	0.040	ug/L
			OF19	4	4	0	0.021	0.015	0.010	0.045	ug/L
		Light Industrial	OFM1	4	4	0	0.014	0.015	0.010	0.015	ug/L
			OFM2	4	4	0	0.019	0.015	0.015	0.030	ug/L
		Heavy Industrial	OF16	5	3	40	0.033	0.040	0.015	0.045	ug/L
			OF22	3	2	33	0.032	0.040	0.015	0.040	ug/L
			OF22B	2	0	100	0.55	0.55	0.21	0.89	ug/L
			WR218	2	2	0	0.023	0.023	0.015	0.030	ug/L
			WR67	5	5	0	0.017	0.015	0.015	0.025	ug/L
		Arkema	WR96	4	1	75	0.25	0.23	0.19	0.36	ug/L
		Chevron - Transportation	WR14	5	5	0	0.017	0.015	0.010	0.030	ug/L
		GASCO	WR107	4	4	0	0.015	0.015	0.010	0.020	ug/L
		Gunderson	WR142	1	1	0	0.015	0.015	0.015	0.015	ug/L
			WR145	1	1	0	0.015	0.015	0.015	0.015	ug/L
			WR147	5	4	20	0.040	0.015	0.015	0.085	ug/L
		OSM	WR22	4	1	75	0.084	0.093	0.050	0.100	ug/L
		Portland Shipyard	WR161	4	3	25	0.024	0.023	0.010	0.040	ug/L
		Schnitzer - Riverside	WR384	4	0	100	0.87	0.81	0.080	1.8	ug/L
		Schnitzer International Slip	WR123	4	3	25	0.041	0.035	0.015	0.080	ug/L
		Sulzer Pump	WR4	4	4	0	0.016	0.015	0.010	0.025	ug/L
	2,4-D	Open Space (Forest Park)	OF22C	2	2	0	0.018	0.018	0.017	0.018	ug/L
		Residential	OF49	2	0	100	1.2	1.2	0.34	2.0	ug/L
		Major Transportation	H30	2	1	50	0.21	0.21	0.20	0.22	ug/L
			SJB	4	3	25	0.39	0.20	0.085	1.1	ug/L
		Open Space/Heavy Ind.	OF18	4	2	50	0.067	0.076	0.017	0.097	ug/L
			OF19	4	1	75	0.090	0.076	0.057	0.15	ug/L
		Light Industrial	OFM1	3	1	67	0.106	0.11	0.017	0.19	ug/L
			OFM2	3	0	100	0.46	0.19	0.083	1.1	ug/L
		Heavy Industrial	OF16	3	0	100	0.33	0.28	0.058	0.64	ug/L
			OF22	3	2	33	0.38	0.18	0.018	0.94	ug/L
			OF22B	3	0	100	1.9	0.78	0.76	4.1	ug/L
			WR218	1	0	100	16.0	16.0	16.0	16.0	ug/L
			WR67	2	2	0	0.11	0.11	0.050	0.17	ug/L
		Arkema	WR96	2	2	0	0.19	0.19	0.19	0.19	ug/L
		Chevron - Transportation	WR14	3	3	0	0.13	0.19	0.018	0.19	ug/L
		GASCO	WR107	4	4	0	0.32	0.059	0.018	1.2	ug/L
		Gunderson	WR142	2	2	0	0.13	0.13	0.085	0.18	ug/L
			WR147	2	2	0	0.18	0.18	0.17	0.18	ug/L
		OSM	WR22	4	4	0	0.036	0.018	0.017	0.090	ug/L
		Portland Shipyard	WR161	5	5	0	0.48	0.19	0.018	1.8	ug/L
		Schnitzer - Riverside	WR384	3	0	100	1.01	1.2	0.64	1.2	ug/L
		Schnitzer International Slip	WR123	4	1	75	0.21	0.20	0.13	0.30	ug/L
		Sulzer Pump	WR4	3	1	67	0.076	0.100	0.017	0.11	ug/L
	Total Phthalates	Open Space (Forest Park)	OF22C	2	1	50	0.14	0.14	0.044	0.23	ug/L
		Residential	OF49	2	0	100	2.0	2.0	1.3	2.7	ug/L
		Major Transportation	SJB	4	0	100	13.8	15.5	3.2	21.0	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	6.3	6.4	2.3	10.0	ug/L
		Light Industrial	OFM2	4	0	100	3.1	2.5	1.9	5.5	ug/L
		Arkema	WR96	4	1	75	0.31	0.30	0.035	0.59	ug/L
		Gunderson	WR142	2	0	100	0.66	0.66	0.48	0.84	ug/L
			WR147	3	0	100	3.2	2.3	2.1	5.1	ug/L
		OSM	WR22	4	0	100	1.2	1.1	0.072	2.4	ug/L
		Portland Shipyard	WR161	5	0	100	2.5	1.3	0.34	7.4	ug/L
		Schnitzer International Slip	WR123	3	1	67	2.5	2.4	0.17	4.8	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]											
	Total PCBs	Open Space (Forest Park)	OF22C	2	1	50	40.4	40.4	0	80.8	pg/L
		Residential	OF49	2	0	100	1180	1180	1140	1220	pg/L
		Major Transportation	H30	1	0	100	17500	17500	17500	17500	pg/L
			SJB	4	0	100	86300	75900	8500	185000	pg/L
		Open Space/Heavy Ind.	OF18	4	0	100	178000	99200	12300	503000	pg/L
			OF19	3	0	100	34600	25000	11100	67700	pg/L
		Light Industrial	OFM1	3	0	100	10110	9040	3490	17800	pg/L
			OFM2	4	0	100	8960	7520	1700	19100	pg/L
		Heavy Industrial	OF16	3	0	100	146000	117000	88500	232000	pg/L
			OF22	4	0	100	24295	23100	9380	41600	pg/L
			OF22B	3	0	100	138000	143000	27800	244000	pg/L
			WR218	2	0	100	34850	34900	17600	52100	pg/L
			WR67	4	0	100	1689	732	344	4950	pg/L
		Arkema	WR96	3	0	100	12250	8340	8210	20200	pg/L
		Chevron - Transportation	WR14	3	0	100	5697	5520	971	10600	pg/L
		GASCO	WR107	4	0	100	2495	2525	510	4420	pg/L
		Gunderson	WR142	2	0	100	1226	1226	852	1600	pg/L
			WR147	3	0	100	658000	428000	237000	1310000	pg/L
		OSM	WR22	4	0	100	278000	272000	243000	325000	pg/L
		Portland Shipyard	WR161	5	0	100	125000	119000	1400	302000	pg/L
		Schnitzer - Riverside	WR384	4	0	100	5125000	4400000	100000	11600000	pg/L
		Schnitzer International Slip	WR123	4	0	100	277000	256000	56700	539000	pg/L
		Sulzer Pump	WR4	3	0	100	8593	4860	4820	16100	pg/L
	Total suspended solids	Open Space (Forest Park)	OF22C	2	0	100	10.0	10.0	10.0	10.0	mg/L
		Residential	OF49	3	0	100	20.7	16.0	8.0	38.0	mg/L
		Major Transportation	H30	3	0	100	46.7	47.0	33.0	60.0	mg/L
			SJB	7	0	100	112	85.0	13.0	248	mg/L
		Open Space/Heavy Ind.	OF18	5	0	100	115	113	17.0	212	mg/L
			OF19	5	0	100	103	81.0	34.0	191	mg/L
		Light Industrial	OFM1	4	0	100	67.0	62.5	46.0	97.0	mg/L
			OFM2	4	0	100	51.3	46.5	31.0	81.0	mg/L
		Heavy Industrial	OF16	5	0	100	89.4	78.0	34.0	171	mg/L
			OF22	4	0	100	176	143	69.0	351	mg/L
			OF22B	3	0	100	220	229	164	266	mg/L
			WR218	2	0	100	52.5	52.5	28.0	77.0	mg/L
			WR67	6	0	100	27.5	18.5	6.0	59.0	mg/L
		Arkema	WR96	5	0	100	12.0	11.0	5.0	20.0	mg/L
		Chevron - Transportation	WR14	5	0	100	38.4	42.0	12.0	51.0	mg/L
		GASCO	WR107	5	0	100	24.0	26.0	10.0	36.0	mg/L
		Gunderson	WR142	2	0	100	11.5	11.5	8.0	15.0	mg/L
			WR145	1	0	100	9.0	9.0	9.0	9.0	mg/L
			WR147	5	0	100	48.2	28.0	15.0	119	mg/L
		OSM	WR22	5	0	100	208	146	128	401	mg/L
		Portland Shipyard	WR161	6	0	100	80.3	39.5	8.0	256	mg/L
		Schnitzer - Riverside	WR384	5	0	100	264	167	6.0	780	mg/L
		Schnitzer International Slip	WR123	6	0	100	231	230	58.0	414	mg/L
		Sulzer Pump	WR4	4	0	100	14.0	13.5	5.0	24.0	mg/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]											
	Total organic carbon	Open Space (Forest Park)	OF22C	2	0	100	3.1	3.1	2.8	3.3	mg/L
		Residential	OF49	3	0	100	9.4	6.8	5.7	15.6	mg/L
		Major Transportation	H30	3	0	100	19.9	15.7	13.5	30.6	mg/L
			SJB	7	0	100	21.9	22.3	3.9	39.5	mg/L
		Open Space/Heavy Ind.	OF18	5	0	100	10.1	7.8	4.3	19.0	mg/L
			OF19	5	0	100	6.4	5.9	4.1	10.1	mg/L
		Light Industrial	OFM1	4	0	100	11.1	12.1	6.1	14.1	mg/L
			OFM2	4	0	100	6.7	5.8	3.2	11.8	mg/L
		Heavy Industrial	OF16	4	0	100	10.3	8.4	6.7	17.5	mg/L
			OF22	4	0	100	22.8	12.1	7.1	60.0	mg/L
			OF22B	3	0	100	26.0	28.3	14.1	35.6	mg/L
			WR218	2	0	100	14.3	14.3	7.1	21.5	mg/L
			WR67	6	0	100	9.2	8.7	4.3	15.4	mg/L
		Arkema	WR96	5	0	100	11.4	7.5	4.5	30.8	mg/L
		Chevron - Transportation	WR14	5	0	100	10.3	6.4	4.1	23.6	mg/L
		GASCO	WR107	5	0	100	4.2	4.2	2.9	5.6	mg/L
		Gunderson	WR142	2	0	100	17.4	17.4	12.0	22.7	mg/L
			WR145	1	0	100	8.1	8.1	8.1	8.1	mg/L
			WR147	5	0	100	15.2	11.7	5.5	38.6	mg/L
		OSM	WR22	5	0	100	5.8	6.0	3.2	8.2	mg/L
		Portland Shipyard	WR161	6	0	100	50.1	13.8	4.1	144	mg/L
		Schnitzer - Riverside	WR384	5	0	100	27.2	23.7	21.7	42.3	mg/L
		Schnitzer International Slip	WR123	6	0	100	14.6	13.1	8.8	27.5	mg/L
		Sulzer Pump	WR4	4	0	100	6.2	5.2	2.9	11.4	mg/L
	Total of 2,4' and 4,4'-DDD, -DDE, -DDT	Heavy Industrial	OF22B	3	0	100	97.7	71.0	12.0	210	ng/L
		Arkema	WR96	4	0	100	4300	2650	900	11000	ng/L
	Low Molecular Weight PAH	Open Space (Forest Park)	OF22C	2	2	0	0	0	0	0	ug/L
		Residential	OF49	3	1	67	0.013	0.019	0	0.021	ug/L
		Major Transportation	H30	3	0	100	0.099	0.076	0.071	0.15	ug/L
			SJB	4	0	100	1.4	0.67	0.31	4.1	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.16	0.072	0.0084	0.47	ug/L
			OF19	3	0	100	0.15	0.15	0.100	0.19	ug/L
		Light Industrial	OFM1	3	0	100	0.33	0.32	0.20	0.46	ug/L
			OFM2	4	0	100	0.086	0.086	0.053	0.12	ug/L
		Heavy Industrial	OF16	3	0	100	0.32	0.31	0.20	0.44	ug/L
			OF22	4	0	100	0.82	0.17	0.040	2.9	ug/L
			OF22B	3	0	100	1.8	0.59	0.51	4.3	ug/L
			WR218	2	0	100	0.12	0.12	0.097	0.14	ug/L
			WR67	4	0	100	0.099	0.085	0.067	0.16	ug/L
		Arkema	WR96	4	0	100	0.013	0.013	0.0067	0.018	ug/L
		Chevron - Transportation	WR14	3	0	100	0.44	0.45	0.19	0.69	ug/L
		GASCO	WR107	4	0	100	0.85	0.46	0.20	2.3	ug/L
		Gunderson	WR142	2	1	50	0.090	0.090	0	0.18	ug/L
			WR145	1	0	100	0.20	0.20	0.20	0.20	ug/L
			WR147	3	0	100	0.17	0.21	0.092	0.22	ug/L
		OSM	WR22	4	0	100	0.30	0.19	0.13	0.68	ug/L
		Portland Shipyard	WR161	5	0	100	0.17	0.21	0.042	0.22	ug/L
		Schnitzer - Riverside	WR384	3	1	67	1.07	1.4	0	1.8	ug/L
		Schnitzer International Slip	WR123	4	0	100	0.25	0.16	0.062	0.64	ug/L
		Sulzer Pump	WR4	3	0	100	0.087	0.087	0.087	0.087	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]											
	High Molecular Weight PAH	Open Space (Forest Park)	OF22C	2	2	0	0	0	0	0	ug/L
		Residential	OF49	3	0	100	0.075	0.071	0.055	0.100	ug/L
		Major Transportation	H30	3	0	100	0.47	0.32	0.20	0.88	ug/L
			SJB	4	0	100	3.4	2.3	0.85	8.1	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.79	0.50	0.075	2.1	ug/L
			OF19	3	0	100	0.81	0.83	0.65	0.95	ug/L
		Light Industrial	OFM1	3	0	100	1.1	1.2	0.89	1.2	ug/L
			OFM2	4	0	100	0.38	0.31	0.21	0.68	ug/L
		Heavy Industrial	OF16	3	0	100	0.58	0.69	0.28	0.78	ug/L
			OF22	4	0	100	0.96	0.88	0.48	1.6	ug/L
			OF22B	3	0	100	0.90	0.64	0.57	1.5	ug/L
			WR218	2	0	100	0.37	0.37	0.35	0.38	ug/L
			WR67	4	0	100	0.53	0.52	0.24	0.86	ug/L
		Arkema	WR96	4	0	100	0.044	0.042	0.038	0.054	ug/L
		Chevron - Transportation	WR14	3	0	100	4.7	4.7	1.2	8.1	ug/L
		GASCO	WR107	4	0	100	4.9	4.1	1.8	9.7	ug/L
		Gunderson	WR142	2	0	100	0.34	0.34	0.17	0.51	ug/L
			WR145	1	0	100	0.70	0.70	0.70	0.70	ug/L
			WR147	3	0	100	0.28	0.36	0.13	0.36	ug/L
		OSM	WR22	4	0	100	0.55	0.54	0.29	0.83	ug/L
		Portland Shipyard	WR161	5	0	100	0.47	0.53	0.076	0.90	ug/L
		Schnitzer - Riverside	WR384	3	0	100	13.5	11.0	0.35	29.0	ug/L
		Schnitzer International Slip	WR123	4	0	100	0.84	0.79	0.37	1.4	ug/L
		Sulzer Pump	WR4	3	0	100	0.16	0.12	0.056	0.31	ug/L
	Total PAHs	Open Space (Forest Park)	OF22C	2	2	0	0	0	0	0	ug/L
		Residential	OF49	3	0	100	0.089	0.092	0.074	0.100	ug/L
		Major Transportation	H30	3	0	100	0.56	0.39	0.28	1.00	ug/L
			SJB	4	0	100	4.8	2.9	1.2	12.0	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	0.96	0.58	0.083	2.6	ug/L
			OF19	3	0	100	0.94	0.98	0.75	1.1	ug/L
		Light Industrial	OFM1	3	0	100	1.4	1.5	1.10	1.6	ug/L
			OFM2	4	0	100	0.46	0.39	0.26	0.80	ug/L
		Heavy Industrial	OF16	3	0	100	0.90	0.98	0.71	1.00	ug/L
			OF22	4	0	100	1.8	1.04	0.52	4.5	ug/L
			OF22B	3	0	100	2.7	2.1	1.2	4.9	ug/L
			WR218	2	0	100	0.48	0.48	0.44	0.52	ug/L
			WR67	4	0	100	0.63	0.60	0.31	1.00	ug/L
		Arkema	WR96	4	0	100	0.056	0.053	0.048	0.072	ug/L
		Chevron - Transportation	WR14	3	0	100	5.1	5.1	1.4	8.8	ug/L
		GASCO	WR107	4	0	100	5.8	4.5	2.0	12.0	ug/L
		Gunderson	WR142	2	0	100	0.43	0.43	0.17	0.69	ug/L
			WR145	1	0	100	0.90	0.90	0.90	0.90	ug/L
			WR147	3	0	100	0.45	0.56	0.22	0.58	ug/L
		OSM	WR22	4	0	100	0.84	0.72	0.42	1.5	ug/L
		Portland Shipyard	WR161	5	0	100	0.64	0.71	0.12	1.1	ug/L
		Schnitzer - Riverside	WR384	3	0	100	14.1	12.0	0.35	30.0	ug/L
		Schnitzer International Slip	WR123	4	0	100	1.1	1.1	0.44	1.7	ug/L
		Sulzer Pump	WR4	3	0	100	0.25	0.21	0.14	0.40	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]											
	Arsenic	Open Space (Forest Park)	OF22C	2	0	100	0.20	0.20	0.20	0.20	ug/L
		Residential	OF49	3	0	100	0.34	0.29	0.26	0.47	ug/L
		Major Transportation	H30	3	0	100	0.50	0.49	0.49	0.53	ug/L
			SJB	4	0	100	0.88	0.86	0.82	0.98	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	1.7	1.7	1.4	1.8	ug/L
			OF19	4	0	100	1.5	1.6	0.77	2.2	ug/L
		Light Industrial	OFM1	4	0	100	0.93	0.94	0.72	1.1	ug/L
			OFM2	4	0	100	1.6	1.5	0.99	2.3	ug/L
		Heavy Industrial	OF16	5	0	100	0.63	0.71	0.34	0.79	ug/L
			OF22	3	0	100	3.3	3.6	2.4	4.0	ug/L
			OF22B	2	0	100	4.9	4.9	4.0	5.8	ug/L
			WR218	2	0	100	1.1	1.1	0.94	1.3	ug/L
			WR67	5	0	100	0.31	0.23	0.13	0.59	ug/L
		Arkema	WR96	4	0	100	17.9	17.5	16.9	19.8	ug/L
		Chevron - Transportation	WR14	5	0	100	0.51	0.54	0.27	0.71	ug/L
		GASCO	WR107	4	0	100	0.76	0.72	0.27	1.3	ug/L
		Gunderson	WR142	1	0	100	0.87	0.87	0.87	0.87	ug/L
			WR145	1	1	0	0	0	0	0	ug/L
			WR147	5	0	100	0.68	0.63	0.38	1.07	ug/L
		OSM	WR22	4	0	100	6.6	6.9	4.2	8.4	ug/L
		Portland Shipyard	WR161	4	0	100	1.5	1.5	1.10	1.8	ug/L
		Schnitzer - Riverside	WR384	4	0	100	2.0	1.9	1.5	2.9	ug/L
		Schnitzer International Slip	WR123	4	0	100	8.2	8.0	2.7	14.3	ug/L
		Sulzer Pump	WR4	4	0	100	0.29	0.27	0.21	0.42	ug/L
	Lead	Open Space (Forest Park)	OF22C	2	0	100	0.42	0.42	0.40	0.44	ug/L
		Residential	OF49	3	0	100	2.8	2.8	1.4	4.3	ug/L
		Major Transportation	H30	3	0	100	8.6	7.1	5.4	13.2	ug/L
			SJB	4	0	100	39.6	30.0	23.2	75.2	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	44.5	39.3	23.2	76.3	ug/L
			OF19	4	0	100	21.8	17.9	10.4	41.0	ug/L
		Light Industrial	OFM1	4	0	100	8.8	4.8	4.2	21.4	ug/L
			OFM2	4	0	100	4.7	3.8	2.9	8.4	ug/L
		Heavy Industrial	OF16	5	0	100	30.4	22.4	13.4	55.4	ug/L
			OF22	3	0	100	16.4	14.7	9.7	24.7	ug/L
			OF22B	2	0	100	148	148	101	195	ug/L
			WR218	2	0	100	12.6	12.6	5.7	19.5	ug/L
			WR67	5	0	100	3.4	1.7	0.62	9.3	ug/L
		Arkema	WR96	4	0	100	12.7	13.5	8.5	15.3	ug/L
		Chevron - Transportation	WR14	5	0	100	7.0	6.7	2.6	11.4	ug/L
		GASCO	WR107	4	0	100	4.9	4.5	2.8	7.8	ug/L
		Gunderson	WR142	1	0	100	1.2	1.2	1.2	1.2	ug/L
			WR145	1	0	100	7.0	7.0	7.0	7.0	ug/L
			WR147	5	0	100	63.3	34.8	14.6	143	ug/L
		OSM	WR22	4	0	100	48.3	49.0	39.1	56.1	ug/L
		Portland Shipyard	WR161	4	0	100	27.8	14.8	11.4	70.0	ug/L
		Schnitzer - Riverside	WR384	4	0	100	377	433	6.2	635	ug/L
		Schnitzer International Slip	WR123	4	0	100	41.7	38.6	17.7	71.8	ug/L
		Sulzer Pump	WR4	4	0	100	6.3	5.1	1.9	13.0	ug/L

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]											
	Mercury	Open Space (Forest Park)	OF22C	2	2	0	0	0	0	0	ug/L
		Residential	OF49	3	3	0	0	0	0	0	ug/L
		Major Transportation	H30	3	2	33	0.010	0	0	0.030	ug/L
			SJB	4	3	25	0.015	0	0	0.060	ug/L
		Open Space/Heavy Ind.	OF18	4	1	75	0.025	0.030	0	0.040	ug/L
			OF19	4	4	0	0	0	0	0	ug/L
		Light Industrial	OFM1	4	4	0	0	0	0	0	ug/L
			OFM2	4	4	0	0	0	0	0	ug/L
		Heavy Industrial	OF16	5	3	40	0.016	0	0	0.040	ug/L
			OF22	3	2	33	0.013	0	0	0.040	ug/L
			OF22B	2	0	100	0.55	0.55	0.21	0.89	ug/L
			WR218	2	2	0	0	0	0	0	ug/L
			WR67	5	5	0	0	0	0	0	ug/L
		Arkema	WR96	4	1	75	0.20	0.22	0	0.36	ug/L
		Chevron - Transportation	WR14	5	5	0	0	0	0	0	ug/L
		GASCO	WR107	4	4	0	0	0	0	0	ug/L
		Gunderson	WR142	1	1	0	0	0	0	0	ug/L
			WR145	1	1	0	0	0	0	0	ug/L
			WR147	5	4	20	0.014	0	0	0.070	ug/L
		OSM	WR22	4	1	75	0.063	0.075	0	0.100	ug/L
		Portland Shipyard	WR161	4	3	25	0.0075	0	0	0.030	ug/L
		Schnitzer - Riverside	WR384	4	0	100	0.87	0.81	0.080	1.8	ug/L
		Schnitzer International Slip	WR123	4	3	25	0.020	0	0	0.080	ug/L
		Sulzer Pump	WR4	4	4	0	0	0	0	0	ug/L
	2,4-D	Open Space (Forest Park)	OF22C	2	2	0	0	0	0	0	ug/L
		Residential	OF49	2	0	100	1.2	1.2	0.34	2.0	ug/L
		Major Transportation	H30	2	1	50	0.11	0.11	0	0.22	ug/L
			SJB	4	3	25	0.28	0	0	1.1	ug/L
		Open Space/Heavy Ind.	OF18	4	2	50	0.041	0.034	0	0.097	ug/L
			OF19	4	1	75	0.072	0.069	0	0.15	ug/L
		Light Industrial	OFM1	3	1	67	0.100	0.11	0	0.19	ug/L
			OFM2	3	0	100	0.46	0.19	0.083	1.1	ug/L
		Heavy Industrial	OF16	3	0	100	0.33	0.28	0.058	0.64	ug/L
			OF22	3	2	33	0.31	0	0	0.94	ug/L
			OF22B	3	0	100	1.9	0.78	0.76	4.1	ug/L
			WR218	1	0	100	16.0	16.0	16.0	16.0	ug/L
			WR67	2	2	0	0	0	0	0	ug/L
		Arkema	WR96	2	2	0	0	0	0	0	ug/L
		Chevron - Transportation	WR14	3	3	0	0	0	0	0	ug/L
		GASCO	WR107	4	4	0	0	0	0	0	ug/L
		Gunderson	WR142	2	2	0	0	0	0	0	ug/L
			WR147	2	2	0	0	0	0	0	ug/L
		OSM	WR22	4	4	0	0	0	0	0	ug/L
		Portland Shipyard	WR161	5	5	0	0	0	0	0	ug/L
		Schnitzer - Riverside	WR384	3	0	100	1.01	1.2	0.64	1.2	ug/L
		Schnitzer International Slip	WR123	4	1	75	0.16	0.18	0	0.30	ug/L
		Sulzer Pump	WR4	3	1	67	0.070	0.100	0	0.11	ug/L
	Total Phthalates	Open Space (Forest Park)	OF22C	2	1	50	0.12	0.12	0	0.23	ug/L
		Residential	OF49	2	0	100	2.0	2.0	1.3	2.7	ug/L
		Major Transportation	SJB	4	0	100	13.8	15.5	3.2	21.0	ug/L
		Open Space/Heavy Ind.	OF18	4	0	100	6.3	6.4	2.3	10.0	ug/L
		Light Industrial	OFM2	4	0	100	3.1	2.5	1.9	5.5	ug/L
		Arkema	WR96	4	1	75	0.28	0.27	0	0.59	ug/L
		Gunderson	WR142	2	0	100	0.66	0.66	0.48	0.84	ug/L
			WR147	3	0	100	3.2	2.3	2.1	5.1	ug/L
		OSM	WR22	4	0	100	1.2	1.1	0.072	2.4	ug/L
		Portland Shipyard	WR161	5	0	100	2.5	1.3	0.34	7.4	ug/L
		Schnitzer International Slip	WR123	3	1	67	2.4	2.4	0	4.8	ug/L

NOTE: For the calculation of summed Totals, individual component ND are set to 0.

[a] When summed Total is ND (all component concentrations are ND), the value is substituted with ½ the DL.

Table: Summary Stats by Individual Stormwater Outfall

Non-detect Treatment	Analyte	Land Use Group	Outfall ID	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units

[b] When summed Total is ND (all component concentrations are ND) the value is substituted with 0.

Draft Elements of Loading Analysis – Portland Harbor Superfund Site

Stormwater Data Loading Calculation

- Cw x Vyr = L
  Cw - Measured Concentration (ug/L) for land use or site
  Vyr - Volume of discharge from land use or site over a year (L/yr)
  L - Load (ug/yr)
- Issues include storms or time of year sampled not representative of loading all year long. Also, determination of Vyr can be difficult (see below).

Sediment Trap Data Loading Calculation

- Cs x TSS x Vyr = L
  Cs - Measured Concentration (ug/kg) for land use or site
  TSS -Total Suspended Sediments (kg/L) in stormwater measured for land use or site
  Vyr - Volume of discharge from land use or site over a year (L/yr)
- Issues include time of year sediment traps deployed (e.g., spring) or TSS from storms not representative of loading all year long. Also, determination of Vyr can be difficult (see below).

Variations of Inputs to Load Calculations

- Volume (Vyr) Variable
  - Model discharge for site or land use over a typical precipitation year or ranges of years (recommended by rationale)
    - Use City Grid Model
    - Use some other model(s)?
  - Use measured volumes for storms (calculate storm loads) and extrapolate to yearly loads based on storm data and/or modeling (not recommended by rationale)
    - Specifics of approach?
  - Others?
- TSS variable
  - Use synoptic TSS/chemical pairs to estimate water concentration prior load estimate
  - Develop TSS average or other statistics that are intended to represent range of TSS for that site or land use and apply to all chemical data
    - Use of historical TSS site data
      - QC screen this for appropriate quality
      - Use grabs or composites or both?
  - Others?

Variations for Concentration (Cw/Cs) Inputs

- Associating Cw/Cs results with land uses and sites
  - Agree on final categories that each site falls into (or use FSP categories)
  - Outlier site analysis to make sure site should be in land use category
    - Remove outliers (by chemical or by site?)

        - Remove *A priori* based on known site uses/sources
        - Remove using statistical outlier approach
        - Both?
    - Use of site-specific industrial sites for non-unique chemicals (e.g., use Gasco for industrial land use category for PCBs)
- Determining Cw/Cs values for each land use or site
    - Group all samples within category
    - Adjust for number of samples from each site in category
    - Sample point outlier analysis?
    - Statistic(s) to use (average, min, max, confidence limits, percentiles, other)
    - Handling of non-detects
        - Don't use
        - Full or half DLs
        - More complex approaches
- Determine basins where land use based approach cannot be used (per rationale)
    - Basin too small?
    - Basin has too many unique sites?
    - Others?
    - Alternative approach for these areas?
- For basins sampled near outfalls
    - Determine which outfalls fall in this category
    - Use land use approach? (not recommended by rationale)
    - Use calculated loads (recommended by rationale)?
    - Use both approaches?

Evaluation of Loading Estimates

- Comparison of stormwater loads to sediment trap loads
    - Total (water) vs. particulate (sediment) issue
    - When to use only one
    - When to use both
    - How to combine into overall range of loads
- Comparison of measured loads to those calculated on land use basis for some outfalls ("cross check" recommended in rationale)

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]										
	Total PCBs	Open Space (Forest Park)	2	1	50	53.5	53.5	26.2	80.8	pg/L
		Residential	2	0	100	1180	1180	1140	1220	pg/L
		Major Transportation	5	0	100	72500	66000	8500	185000	pg/L
		Open Space/Heavy Ind.	7	0	100	117000	67700	11100	503000	pg/L
		Light Industrial	7	0	100	9450	9040	1700	19100	pg/L
		Heavy Industrial	16	0	100	64100	30400	344	244000	pg/L
		Arkema	3	0	100	12300	8340	8210	20200	pg/L
		Chevron - Transportation	3	0	100	5700	5520	971	10600	pg/L
		GASCO	4	0	100	2500	2530	510	4420	pg/L
		Gunderson	5	0	100	395000	237000	852	1310000	pg/L
		OSM	4	0	100	278000	271500	243000	325000	pg/L
		Portland Shipyard	5	0	100	125000	119000	1400	302000	pg/L
		Schnitzer - Riverside	4	0	100	5130000	4400000	100000	11600000	pg/L
		Schnitzer International Slip	4	0	100	277000	255500	56700	539000	pg/L
		Sulzer Pump	3	0	100	8590	4860	4820	16100	pg/L
	Total suspended solids	Open Space (Forest Park)	2	0	100	10.0	10.0	10.0	10.0	mg/L
		Residential	3	0	100	20.7	16.0	8.0	38.0	mg/L
		Major Transportation	10	0	100	92.2	71.0	13.0	248	mg/L
		Open Space/Heavy Ind.	10	0	100	109	104	17.0	212	mg/L
		Light Industrial	8	0	100	59.1	53.0	31.0	97.0	mg/L
		Heavy Industrial	20	0	100	104	73.0	6.0	351	mg/L
		Arkema	5	0	100	12.0	11.0	5.0	20.0	mg/L
		Chevron - Transportation	5	0	100	38.4	42.0	12.0	51.0	mg/L
		GASCO	5	0	100	24.0	26.0	10.0	36.0	mg/L
		Gunderson	8	0	100	34.1	17.0	8.0	119	mg/L
		OSM	5	0	100	208	146	128	401	mg/L
		Portland Shipyard	6	0	100	80.3	39.5	8.0	256	mg/L
		Schnitzer - Riverside	5	0	100	264	167	6.0	780	mg/L
		Schnitzer International Slip	6	0	100	231	230	58.0	414	mg/L
		Sulzer Pump	4	0	100	14.0	13.5	5.0	24.0	mg/L
	Total organic carbon	Open Space (Forest Park)	2	0	100	3.1	3.1	2.8	3.3	mg/L
		Residential	3	0	100	9.4	6.8	5.7	15.6	mg/L
		Major Transportation	10	0	100	21.3	19.8	3.9	39.5	mg/L
		Open Space/Heavy Ind.	10	0	100	8.3	7.0	4.1	19.0	mg/L
		Light Industrial	8	0	100	8.9	9.0	3.2	14.1	mg/L
		Heavy Industrial	19	0	100	15.5	10.6	4.3	60.0	mg/L
		Arkema	5	0	100	11.4	7.5	4.5	30.8	mg/L
		Chevron - Transportation	5	0	100	10.3	6.4	4.1	23.6	mg/L
		GASCO	5	0	100	4.2	4.2	2.9	5.6	mg/L
		Gunderson	8	0	100	14.9	11.9	5.5	38.6	mg/L
		OSM	5	0	100	5.8	6.0	3.2	8.2	mg/L
		Portland Shipyard	6	0	100	50.1	13.8	4.1	144	mg/L
		Schnitzer - Riverside	5	0	100	27.2	23.7	21.7	42.3	mg/L
		Schnitzer International Slip	6	0	100	14.6	13.1	8.8	27.5	mg/L
		Sulzer Pump	4	0	100	6.2	5.2	2.9	11.4	mg/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]										
	Total of 2,4' and 4,4'-DDD, -DDE, -DDT	Heavy Industrial	3	0	100	97.7	71.0	12.0	210	ng/L
		Arkema	4	0	100	4300	2650	900	11000	ng/L
	Low Molecular Weight PAH	Open Space (Forest Park)	2	2	0	0.0080	0.0080	0.0075	0.0085	ug/L
		Residential	3	1	67	0.017	0.019	0.0095	0.021	ug/L
		Major Transportation	7	0	100	0.86	0.31	0.071	4.1	ug/L
		Open Space/Heavy Ind.	7	0	100	0.15	0.100	0.0084	0.47	ug/L
		Light Industrial	7	0	100	0.19	0.12	0.053	0.46	ug/L
		Heavy Industrial	16	0	100	0.64	0.18	0.040	4.3	ug/L
		Arkema	4	0	100	0.013	0.013	0.0067	0.018	ug/L
		Chevron - Transportation	3	0	100	0.44	0.45	0.19	0.69	ug/L
		GASCO	4	0	100	0.85	0.46	0.20	2.3	ug/L
		Gunderson	6	1	83	0.15	0.19	0.0025	0.22	ug/L
		OSM	4	0	100	0.30	0.19	0.13	0.68	ug/L
		Portland Shipyard	5	0	100	0.17	0.21	0.042	0.22	ug/L
		Schnitzer - Riverside	3	1	67	1.08	1.4	0.046	1.8	ug/L
		Schnitzer International Slip	4	0	100	0.25	0.16	0.062	0.64	ug/L
		Sulzer Pump	3	0	100	0.087	0.087	0.087	0.087	ug/L
	High Molecular Weight PAH	Open Space (Forest Park)	2	2	0	0.0028	0.0028	0.0027	0.0028	ug/L
		Residential	3	0	100	0.075	0.071	0.055	0.100	ug/L
		Major Transportation	7	0	100	2.1	0.88	0.20	8.1	ug/L
		Open Space/Heavy Ind.	7	0	100	0.80	0.65	0.075	2.1	ug/L
		Light Industrial	7	0	100	0.69	0.68	0.21	1.2	ug/L
		Heavy Industrial	16	0	100	0.70	0.62	0.24	1.6	ug/L
		Arkema	4	0	100	0.044	0.042	0.038	0.054	ug/L
		Chevron - Transportation	3	0	100	4.7	4.7	1.2	8.1	ug/L
		GASCO	4	0	100	4.9	4.1	1.8	9.7	ug/L
		Gunderson	6	0	100	0.37	0.36	0.13	0.70	ug/L
		OSM	4	0	100	0.55	0.54	0.29	0.83	ug/L
		Portland Shipyard	5	0	100	0.47	0.53	0.076	0.90	ug/L
		Schnitzer - Riverside	3	0	100	13.5	11.0	0.35	29.0	ug/L
		Schnitzer International Slip	4	0	100	0.84	0.79	0.37	1.4	ug/L
		Sulzer Pump	3	0	100	0.16	0.12	0.056	0.31	ug/L
	Total PAHs	Open Space (Forest Park)	2	2	0	0.0080	0.0080	0.0075	0.0085	ug/L
		Residential	3	0	100	0.089	0.092	0.074	0.100	ug/L
		Major Transportation	7	0	100	3.0	1.2	0.28	12.0	ug/L
		Open Space/Heavy Ind.	7	0	100	0.95	0.75	0.083	2.6	ug/L
		Light Industrial	7	0	100	0.86	0.80	0.26	1.6	ug/L
		Heavy Industrial	16	0	100	1.3	0.88	0.31	4.9	ug/L
		Arkema	4	0	100	0.056	0.053	0.048	0.072	ug/L
		Chevron - Transportation	3	0	100	5.1	5.1	1.4	8.8	ug/L
		GASCO	4	0	100	5.8	4.5	2.0	12.0	ug/L
		Gunderson	6	0	100	0.52	0.57	0.17	0.90	ug/L
		OSM	4	0	100	0.84	0.72	0.42	1.5	ug/L
		Portland Shipyard	5	0	100	0.64	0.71	0.12	1.1	ug/L
		Schnitzer - Riverside	3	0	100	14.1	12.0	0.35	30.0	ug/L
		Schnitzer International Slip	4	0	100	1.10	1.1	0.44	1.7	ug/L
		Sulzer Pump	3	0	100	0.25	0.21	0.14	0.40	ug/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]										
	Arsenic	Open Space (Forest Park)	2	0	100	0.20	0.20	0.20	0.20	ug/L
		Residential	3	0	100	0.34	0.29	0.26	0.47	ug/L
		Major Transportation	7	0	100	0.72	0.82	0.49	0.98	ug/L
		Open Space/Heavy Ind.	8	0	100	1.6	1.7	0.77	2.2	ug/L
		Light Industrial	8	0	100	1.3	1.06	0.72	2.3	ug/L
		Heavy Industrial	17	0	100	1.6	0.78	0.13	5.8	ug/L
		Arkema	4	0	100	17.9	17.5	16.9	19.8	ug/L
		Chevron - Transportation	5	0	100	0.51	0.54	0.27	0.71	ug/L
		GASCO	4	0	100	0.76	0.72	0.27	1.3	ug/L
		Gunderson	7	1	86	0.61	0.63	0.0035	1.07	ug/L
		OSM	4	0	100	6.6	6.9	4.2	8.4	ug/L
		Portland Shipyard	4	0	100	1.5	1.5	1.10	1.8	ug/L
		Schnitzer - Riverside	4	0	100	2.0	1.9	1.5	2.9	ug/L
		Schnitzer International Slip	4	0	100	8.2	8.0	2.7	14.3	ug/L
		Sulzer Pump	4	0	100	0.29	0.27	0.21	0.42	ug/L
	Lead	Open Space (Forest Park)	2	0	100	0.42	0.42	0.40	0.44	ug/L
		Residential	3	0	100	2.8	2.8	1.4	4.3	ug/L
		Major Transportation	7	0	100	26.3	23.2	5.4	75.2	ug/L
		Open Space/Heavy Ind.	8	0	100	33.2	24.2	10.4	76.3	ug/L
		Light Industrial	8	0	100	6.7	4.2	2.9	21.4	ug/L
		Heavy Industrial	17	0	100	31.7	14.7	0.62	195	ug/L
		Arkema	4	0	100	12.7	13.5	8.5	15.3	ug/L
		Chevron - Transportation	5	0	100	7.0	6.7	2.6	11.4	ug/L
		GASCO	4	0	100	4.9	4.5	2.8	7.8	ug/L
		Gunderson	7	0	100	46.4	25.5	1.2	143	ug/L
		OSM	4	0	100	48.3	49.0	39.1	56.1	ug/L
		Portland Shipyard	4	0	100	27.8	14.8	11.4	70.0	ug/L
		Schnitzer - Riverside	4	0	100	377	433	6.2	635	ug/L
		Schnitzer International Slip	4	0	100	41.7	38.6	17.7	71.8	ug/L
		Sulzer Pump	4	0	100	6.3	5.1	1.9	13.0	ug/L
	Mercury	Open Space (Forest Park)	2	2	0	0.015	0.015	0.015	0.015	ug/L
		Residential	3	3	0	0.015	0.015	0.015	0.015	ug/L
		Major Transportation	7	5	29	0.028	0.030	0.010	0.060	ug/L
		Open Space/Heavy Ind.	8	5	38	0.028	0.030	0.010	0.045	ug/L
		Light Industrial	8	8	0	0.016	0.015	0.010	0.030	ug/L
		Heavy Industrial	17	12	29	0.088	0.025	0.015	0.89	ug/L
		Arkema	4	1	75	0.25	0.23	0.19	0.36	ug/L
		Chevron - Transportation	5	5	0	0.017	0.015	0.010	0.030	ug/L
		GASCO	4	4	0	0.015	0.015	0.010	0.020	ug/L
		Gunderson	7	6	14	0.033	0.015	0.015	0.085	ug/L
		OSM	4	1	75	0.084	0.093	0.050	0.100	ug/L
		Portland Shipyard	4	3	25	0.024	0.023	0.010	0.040	ug/L
		Schnitzer - Riverside	4	0	100	0.87	0.81	0.080	1.8	ug/L
		Schnitzer International Slip	4	3	25	0.041	0.035	0.015	0.080	ug/L
		Sulzer Pump	4	4	0	0.016	0.015	0.010	0.025	ug/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 1/2 DL[a]										
	2,4-D	Open Space (Forest Park)	2	2	0	0.018	0.018	0.017	0.018	ug/L
		Residential	2	0	100	1.2	1.2	0.34	2.0	ug/L
		Major Transportation	6	4	33	0.33	0.20	0.085	1.1	ug/L
		Open Space/Heavy Ind.	8	3	63	0.078	0.076	0.017	0.15	ug/L
		Light Industrial	6	1	83	0.28	0.15	0.017	1.1	ug/L
		Heavy Industrial	12	4	67	2.0	0.46	0.018	16.0	ug/L
		Arkema	2	2	0	0.19	0.19	0.19	0.19	ug/L
		Chevron - Transportation	3	3	0	0.13	0.19	0.018	0.19	ug/L
		GASCO	4	4	0	0.32	0.059	0.018	1.2	ug/L
		Gunderson	4	4	0	0.15	0.18	0.085	0.18	ug/L
		OSM	4	4	0	0.036	0.018	0.017	0.090	ug/L
		Portland Shipyard	5	5	0	0.48	0.19	0.018	1.8	ug/L
		Schnitzer - Riverside	3	0	100	1.01	1.2	0.64	1.2	ug/L
		Schnitzer International Slip	4	1	75	0.21	0.20	0.13	0.30	ug/L
		Sulzer Pump	3	1	67	0.076	0.100	0.017	0.11	ug/L
	Total Phthalates	Open Space (Forest Park)	2	1	50	0.14	0.14	0.044	0.23	ug/L
		Residential	2	0	100	2.0	2.0	1.3	2.7	ug/L
		Major Transportation	4	0	100	13.8	15.5	3.2	21.0	ug/L
		Open Space/Heavy Ind.	4	0	100	6.3	6.4	2.3	10.0	ug/L
		Light Industrial	4	0	100	3.1	2.5	1.9	5.5	ug/L
		Arkema	4	1	75	0.31	0.30	0.035	0.59	ug/L
		Gunderson	5	0	100	2.2	2.1	0.48	5.1	ug/L
		OSM	4	0	100	1.2	1.1	0.072	2.4	ug/L
		Portland Shipyard	5	0	100	2.5	1.3	0.34	7.4	ug/L
		Schnitzer International Slip	3	1	67	2.5	2.4	0.17	4.8	ug/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[p]										
	Total PCBs	Open Space (Forest Park)	2	1	50	40.4	40.4	0	80.8	pg/L
		Residential	2	0	100	1180	1180	1140	1220	pg/L
		Major Transportation	5	0	100	72500	66000	8500	185000	pg/L
		Open Space/Heavy Ind.	7	0	100	117000	67700	11100	503000	pg/L
		Light Industrial	7	0	100	9450	9040	1700	19100	pg/L
		Heavy Industrial	16	0	100	64100	30400	344	244000	pg/L
		Arkema	3	0	100	12300	8340	8210	20200	pg/L
		Chevron - Transportation	3	0	100	5700	5520	971	10600	pg/L
		GASCO	4	0	100	2500	2530	510	4420	pg/L
		Gunderson	5	0	100	395000	237000	852	1310000	pg/L
		OSM	4	0	100	278000	271500	243000	325000	pg/L
		Portland Shipyard	5	0	100	125000	119000	1400	302000	pg/L
		Schnitzer - Riverside	4	0	100	5130000	4400000	100000	11600000	pg/L
		Schnitzer International Slip	4	0	100	277000	255500	56700	539000	pg/L
		Sulzer Pump	3	0	100	8590	4860	4820	16100	pg/L
	Total suspended solids	Open Space (Forest Park)	2	0	100	10.0	10.0	10.0	10.0	mg/L
		Residential	3	0	100	20.7	16.0	8.0	38.0	mg/L
		Major Transportation	10	0	100	92.2	71.0	13.0	248	mg/L
		Open Space/Heavy Ind.	10	0	100	109	104	17.0	212	mg/L
		Light Industrial	8	0	100	59.1	53.0	31.0	97.0	mg/L
		Heavy Industrial	20	0	100	104	73.0	6.0	351	mg/L
		Arkema	5	0	100	12.0	11.0	5.0	20.0	mg/L
		Chevron - Transportation	5	0	100	38.4	42.0	12.0	51.0	mg/L
		GASCO	5	0	100	24.0	26.0	10.0	36.0	mg/L
		Gunderson	8	0	100	34.1	17.0	8.0	119	mg/L
		OSM	5	0	100	208	146	128	401	mg/L
		Portland Shipyard	6	0	100	80.3	39.5	8.0	256	mg/L
		Schnitzer - Riverside	5	0	100	264	167	6.0	780	mg/L
		Schnitzer International Slip	6	0	100	231	230	58.0	414	mg/L
		Sulzer Pump	4	0	100	14.0	13.5	5.0	24.0	mg/L
	Total organic carbon	Open Space (Forest Park)	2	0	100	3.1	3.1	2.8	3.3	mg/L
		Residential	3	0	100	9.4	6.8	5.7	15.6	mg/L
		Major Transportation	10	0	100	21.3	19.8	3.9	39.5	mg/L
		Open Space/Heavy Ind.	10	0	100	8.3	7.0	4.1	19.0	mg/L
		Light Industrial	8	0	100	8.9	9.0	3.2	14.1	mg/L
		Heavy Industrial	19	0	100	15.5	10.6	4.3	60.0	mg/L
		Arkema	5	0	100	11.4	7.5	4.5	30.8	mg/L
		Chevron - Transportation	5	0	100	10.3	6.4	4.1	23.6	mg/L
		GASCO	5	0	100	4.2	4.2	2.9	5.6	mg/L
		Gunderson	8	0	100	14.9	11.9	5.5	38.6	mg/L
		OSM	5	0	100	5.8	6.0	3.2	8.2	mg/L
		Portland Shipyard	6	0	100	50.1	13.8	4.1	144	mg/L
		Schnitzer - Riverside	5	0	100	27.2	23.7	21.7	42.3	mg/L
		Schnitzer International Slip	6	0	100	14.6	13.1	8.8	27.5	mg/L
		Sulzer Pump	4	0	100	6.2	5.2	2.9	11.4	mg/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[p]										
	Total of 2,4' and 4,4'-DDD, -DDE, -DDT	Heavy Industrial	3	0	100	97.7	71.0	12.0	210	ng/L
		Arkema	4	0	100	4300	2650	900	11000	ng/L
	Low Molecular Weight PAH	Open Space (Forest Park)	2	2	0	0	0	0	0	ug/L
		Residential	3	1	67	0.013	0.019	0	0.021	ug/L
		Major Transportation	7	0	100	0.86	0.31	0.071	4.1	ug/L
		Open Space/Heavy Ind.	7	0	100	0.15	0.100	0.0084	0.47	ug/L
		Light Industrial	7	0	100	0.19	0.12	0.053	0.46	ug/L
		Heavy Industrial	16	0	100	0.64	0.18	0.040	4.3	ug/L
		Arkema	4	0	100	0.013	0.013	0.0067	0.018	ug/L
		Chevron - Transportation	3	0	100	0.44	0.45	0.19	0.69	ug/L
		GASCO	4	0	100	0.85	0.46	0.20	2.3	ug/L
		Gunderson	6	1	83	0.15	0.19	0	0.22	ug/L
		OSM	4	0	100	0.30	0.19	0.13	0.68	ug/L
		Portland Shipyard	5	0	100	0.17	0.21	0.042	0.22	ug/L
		Schnitzer - Riverside	3	1	67	1.07	1.4	0	1.8	ug/L
		Schnitzer International Slip	4	0	100	0.25	0.16	0.062	0.64	ug/L
		Sulzer Pump	3	0	100	0.087	0.087	0.087	0.087	ug/L
	High Molecular Weight PAH	Open Space (Forest Park)	2	2	0	0	0	0	0	ug/L
		Residential	3	0	100	0.075	0.071	0.055	0.100	ug/L
		Major Transportation	7	0	100	2.1	0.88	0.20	8.1	ug/L
		Open Space/Heavy Ind.	7	0	100	0.80	0.65	0.075	2.1	ug/L
		Light Industrial	7	0	100	0.69	0.68	0.21	1.2	ug/L
		Heavy Industrial	16	0	100	0.70	0.62	0.24	1.6	ug/L
		Arkema	4	0	100	0.044	0.042	0.038	0.054	ug/L
		Chevron - Transportation	3	0	100	4.7	4.7	1.2	8.1	ug/L
		GASCO	4	0	100	4.9	4.1	1.8	9.7	ug/L
		Gunderson	6	0	100	0.37	0.36	0.13	0.70	ug/L
		OSM	4	0	100	0.55	0.54	0.29	0.83	ug/L
		Portland Shipyard	5	0	100	0.47	0.53	0.076	0.90	ug/L
		Schnitzer - Riverside	3	0	100	13.5	11.0	0.35	29.0	ug/L
		Schnitzer International Slip	4	0	100	0.84	0.79	0.37	1.4	ug/L
		Sulzer Pump	3	0	100	0.16	0.12	0.056	0.31	ug/L
	Total PAHs	Open Space (Forest Park)	2	2	0	0	0	0	0	ug/L
		Residential	3	0	100	0.089	0.092	0.074	0.100	ug/L
		Major Transportation	7	0	100	3.0	1.2	0.28	12.0	ug/L
		Open Space/Heavy Ind.	7	0	100	0.95	0.75	0.083	2.6	ug/L
		Light Industrial	7	0	100	0.86	0.80	0.26	1.6	ug/L
		Heavy Industrial	16	0	100	1.3	0.88	0.31	4.9	ug/L
		Arkema	4	0	100	0.056	0.053	0.048	0.072	ug/L
		Chevron - Transportation	3	0	100	5.1	5.1	1.4	8.8	ug/L
		GASCO	4	0	100	5.8	4.5	2.0	12.0	ug/L
		Gunderson	6	0	100	0.52	0.57	0.17	0.90	ug/L
		OSM	4	0	100	0.84	0.72	0.42	1.5	ug/L
		Portland Shipyard	5	0	100	0.64	0.71	0.12	1.1	ug/L
		Schnitzer - Riverside	3	0	100	14.1	12.0	0.35	30.0	ug/L
		Schnitzer International Slip	4	0	100	1.10	1.1	0.44	1.7	ug/L
		Sulzer Pump	3	0	100	0.25	0.21	0.14	0.40	ug/L

Table: Summary Stats by Land Use Group

Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[p]										
	Arsenic	Open Space (Forest Park)	2	0	100	0.20	0.20	0.20	0.20	ug/L
		Residential	3	0	100	0.34	0.29	0.26	0.47	ug/L
		Major Transportation	7	0	100	0.72	0.82	0.49	0.98	ug/L
		Open Space/Heavy Ind.	8	0	100	1.6	1.7	0.77	2.2	ug/L
		Light Industrial	8	0	100	1.3	1.06	0.72	2.3	ug/L
		Heavy Industrial	17	0	100	1.6	0.78	0.13	5.8	ug/L
		Arkema	4	0	100	17.9	17.5	16.9	19.8	ug/L
		Chevron - Transportation	5	0	100	0.51	0.54	0.27	0.71	ug/L
		GASCO	4	0	100	0.76	0.72	0.27	1.3	ug/L
		Gunderson	7	1	86	0.61	0.63	0	1.07	ug/L
		OSM	4	0	100	6.6	6.9	4.2	8.4	ug/L
		Portland Shipyard	4	0	100	1.5	1.5	1.10	1.8	ug/L
		Schnitzer - Riverside	4	0	100	2.0	1.9	1.5	2.9	ug/L
		Schnitzer International Slip	4	0	100	8.2	8.0	2.7	14.3	ug/L
		Sulzer Pump	4	0	100	0.29	0.27	0.21	0.42	ug/L
	Lead	Open Space (Forest Park)	2	0	100	0.42	0.42	0.40	0.44	ug/L
		Residential	3	0	100	2.8	2.8	1.4	4.3	ug/L
		Major Transportation	7	0	100	26.3	23.2	5.4	75.2	ug/L
		Open Space/Heavy Ind.	8	0	100	33.2	24.2	10.4	76.3	ug/L
		Light Industrial	8	0	100	6.7	4.2	2.9	21.4	ug/L
		Heavy Industrial	17	0	100	31.7	14.7	0.62	195	ug/L
		Arkema	4	0	100	12.7	13.5	8.5	15.3	ug/L
		Chevron - Transportation	5	0	100	7.0	6.7	2.6	11.4	ug/L
		GASCO	4	0	100	4.9	4.5	2.8	7.8	ug/L
		Gunderson	7	0	100	46.4	25.5	1.2	143	ug/L
		OSM	4	0	100	48.3	49.0	39.1	56.1	ug/L
		Portland Shipyard	4	0	100	27.8	14.8	11.4	70.0	ug/L
		Schnitzer - Riverside	4	0	100	377	433	6.2	635	ug/L
		Schnitzer International Slip	4	0	100	41.7	38.6	17.7	71.8	ug/L
		Sulzer Pump	4	0	100	6.3	5.1	1.9	13.0	ug/L
	Mercury	Open Space (Forest Park)	2	2	0	0	0	0	0	ug/L
		Residential	3	3	0	0	0	0	0	ug/L
		Major Transportation	7	5	29	0.013	0	0	0.060	ug/L
		Open Space/Heavy Ind.	8	5	38	0.013	0	0	0.040	ug/L
		Light Industrial	8	8	0	0	0	0	0	ug/L
		Heavy Industrial	17	12	29	0.072	0	0	0.89	ug/L
		Arkema	4	1	75	0.20	0.22	0	0.36	ug/L
		Chevron - Transportation	5	5	0	0	0	0	0	ug/L
		GASCO	4	4	0	0	0	0	0	ug/L
		Gunderson	7	6	14	0.0100	0	0	0.070	ug/L
		OSM	4	1	75	0.063	0.075	0	0.100	ug/L
		Portland Shipyard	4	3	25	0.0075	0	0	0.030	ug/L
		Schnitzer - Riverside	4	0	100	0.87	0.81	0.080	1.8	ug/L
		Schnitzer International Slip	4	3	25	0.020	0	0	0.080	ug/L
		Sulzer Pump	4	4	0	0	0	0	0	ug/L

Table: Summary Stats by Land Use Group

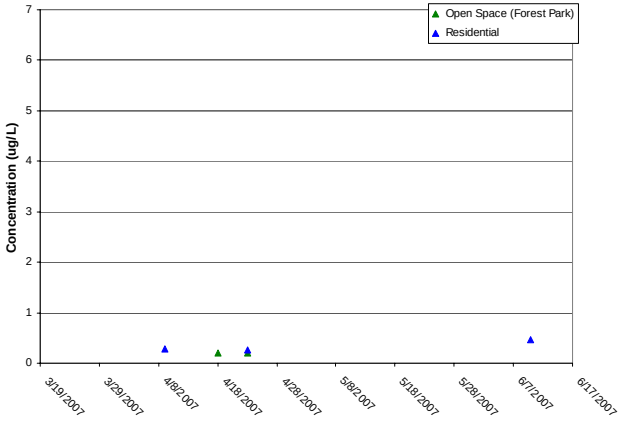
Non-detect Treatment	Analyte	Land Use Group	Number of Samples	Number of Non-Detects	Detection Frequency (%)	Mean	Median	Minimum	Maximum	units
Substitution of ND at 0[b]										
	2,4-D	Open Space (Forest Park)	2	2	0	0	0	0	0	ug/L
		Residential	2	0	100	1.2	1.2	0.34	2.0	ug/L
		Major Transportation	6	4	33	0.22	0	0	1.1	ug/L
		Open Space/Heavy Ind.	8	3	63	0.057	0.062	0	0.15	ug/L
		Light Industrial	6	1	83	0.28	0.15	0	1.1	ug/L
		Heavy Industrial	12	4	67	2.0	0.46	0	16.0	ug/L
		Arkema	2	2	0	0	0	0	0	ug/L
		Chevron - Transportation	3	3	0	0	0	0	0	ug/L
		GASCO	4	4	0	0	0	0	0	ug/L
		Gunderson	4	4	0	0	0	0	0	ug/L
		OSM	4	4	0	0	0	0	0	ug/L
		Portland Shipyard	5	5	0	0	0	0	0	ug/L
		Schnitzer - Riverside	3	0	100	1.01	1.2	0.64	1.2	ug/L
		Schnitzer International Slip	4	1	75	0.16	0.18	0	0.30	ug/L
		Sulzer Pump	3	1	67	0.070	0.100	0	0.11	ug/L
	Total Phthalates	Open Space (Forest Park)	2	1	50	0.12	0.12	0	0.23	ug/L
		Residential	2	0	100	2.0	2.0	1.3	2.7	ug/L
		Major Transportation	4	0	100	13.8	15.5	3.2	21.0	ug/L
		Open Space/Heavy Ind.	4	0	100	6.3	6.4	2.3	10.0	ug/L
		Light Industrial	4	0	100	3.1	2.5	1.9	5.5	ug/L
		Arkema	4	1	75	0.28	0.27	0	0.59	ug/L
		Gunderson	5	0	100	2.2	2.1	0.48	5.1	ug/L
		OSM	4	0	100	1.2	1.1	0.072	2.4	ug/L
		Portland Shipyard	5	0	100	2.5	1.3	0.34	7.4	ug/L
		Schnitzer International Slip	3	1	67	2.4	2.4	0	4.8	ug/L

NOTE: For the calculation of summed Totals, individual component ND are set to 0.

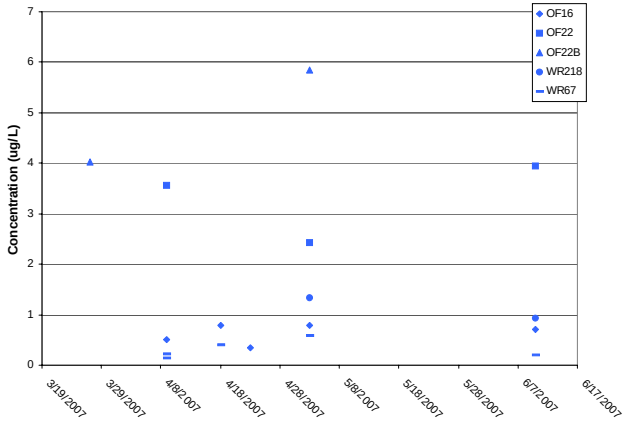
[a] When summed Total is ND (all component concentrations are ND), the value is substituted with ½ the DL.

[b] When summed Total is ND (all component concentrations are ND) the value is substituted with 0.

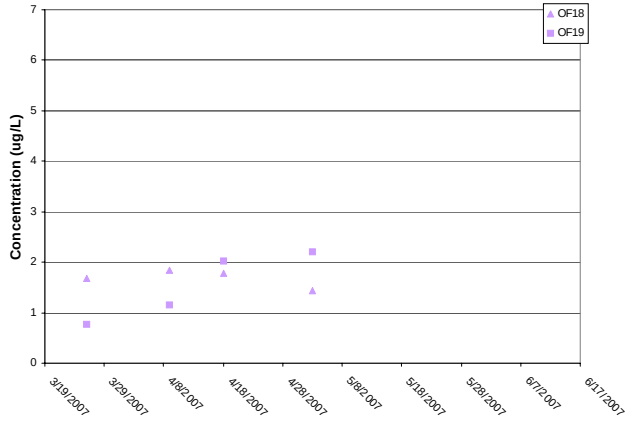
Arsenic-Open Space and Residential



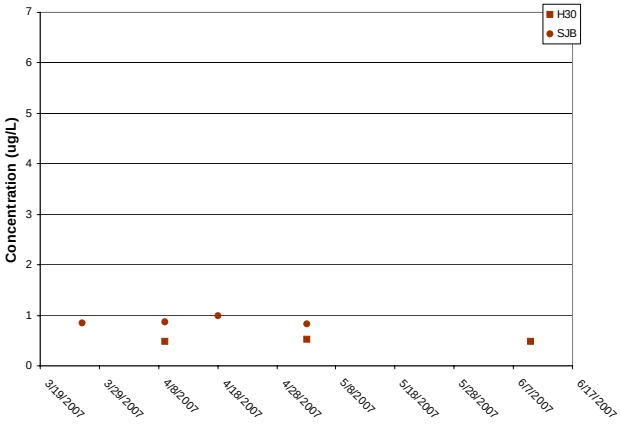
Arsenic-Heavy Industry



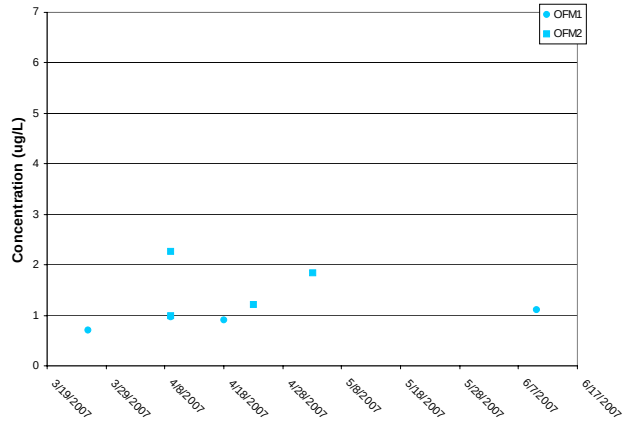
Arsenic-Open Space/Heavy Industry



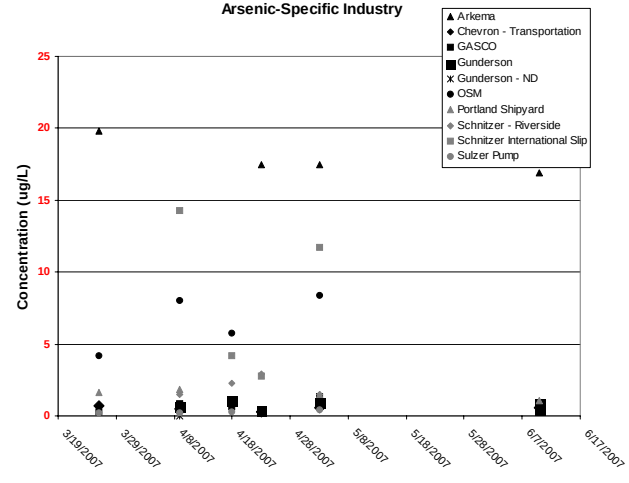
Arsenic-Major Transportation



Arsenic-Light Industry

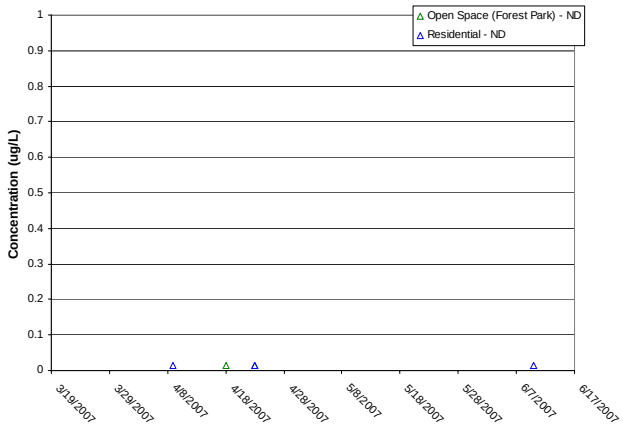


Arsenic-Specific Industry

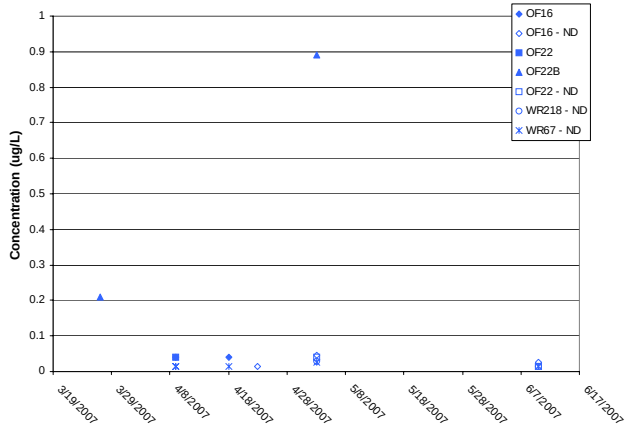


Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

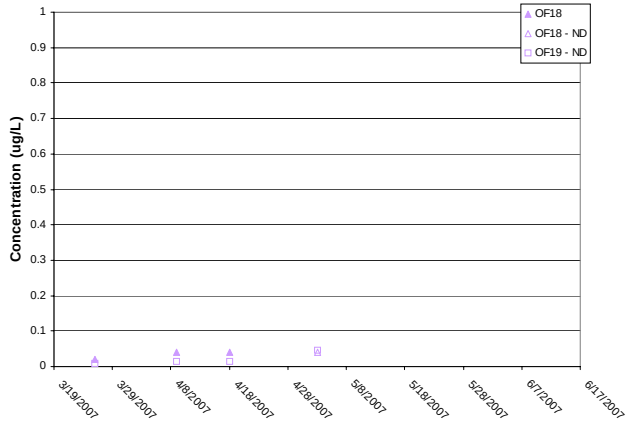
Mercury-Open Space and Residential



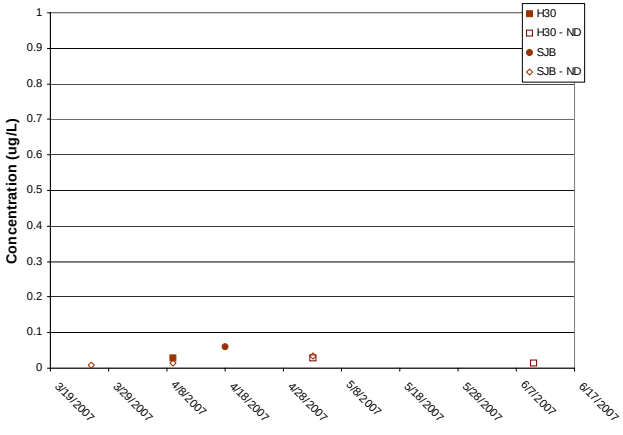
Mercury-Heavy Industry



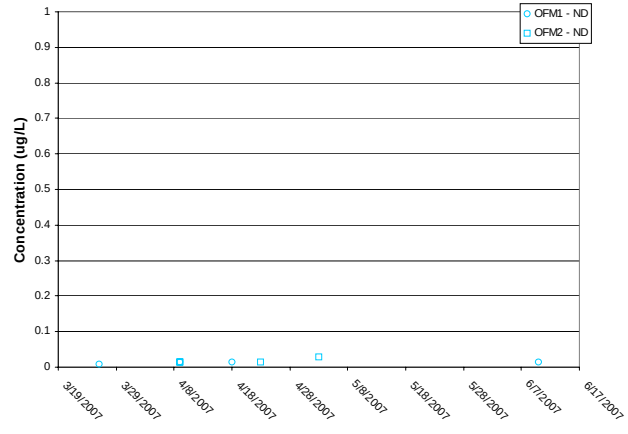
Mercury-Open Space/Heavy Industry



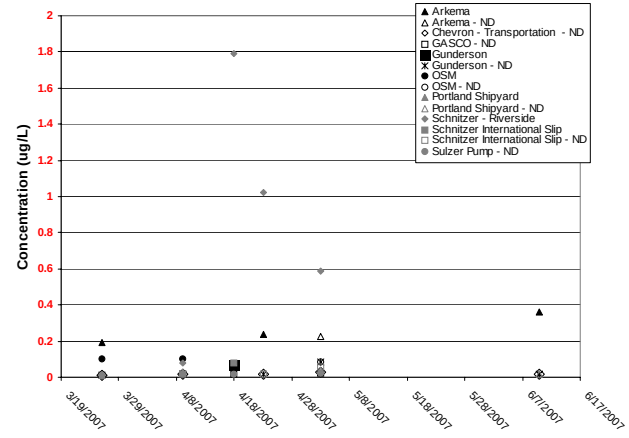
Mercury-Major Transportation



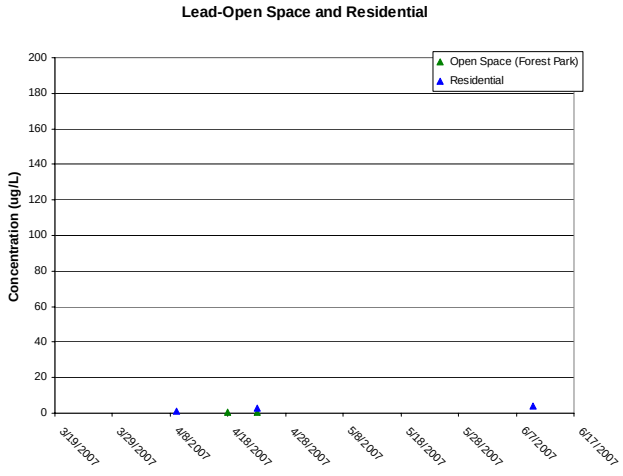
Mercury-Light Industry

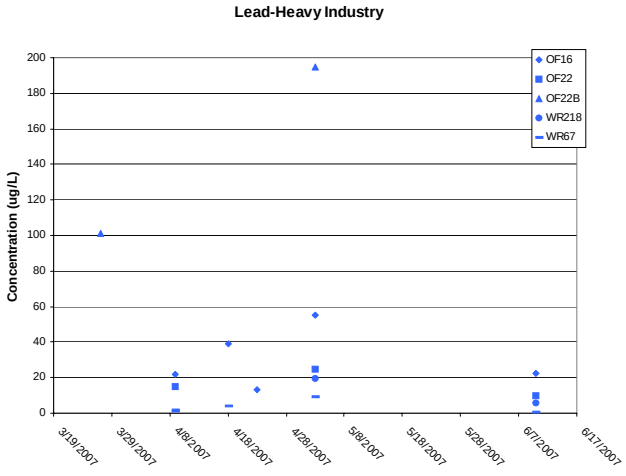


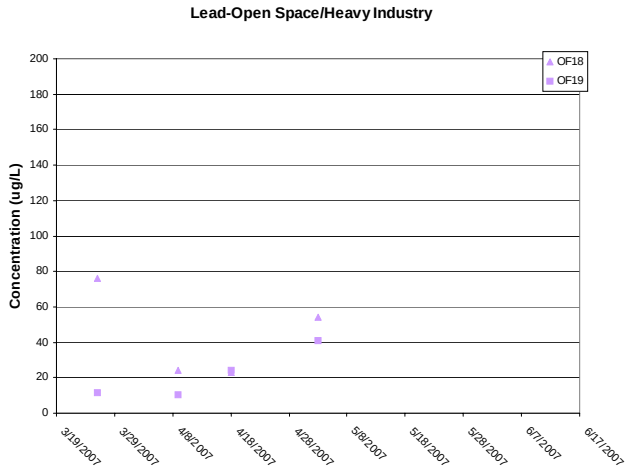
Mercury-Specific Industry

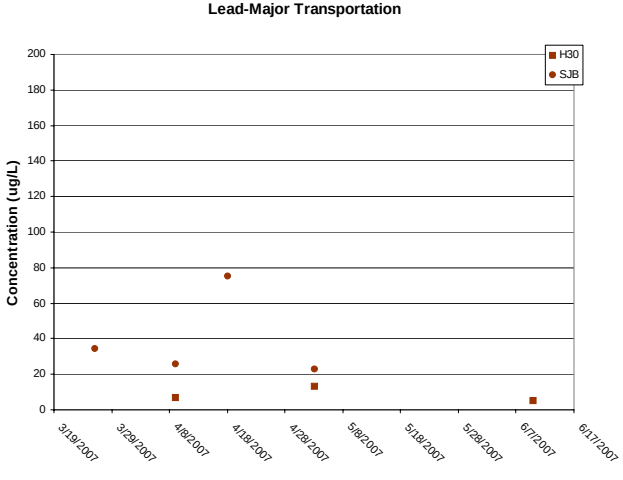


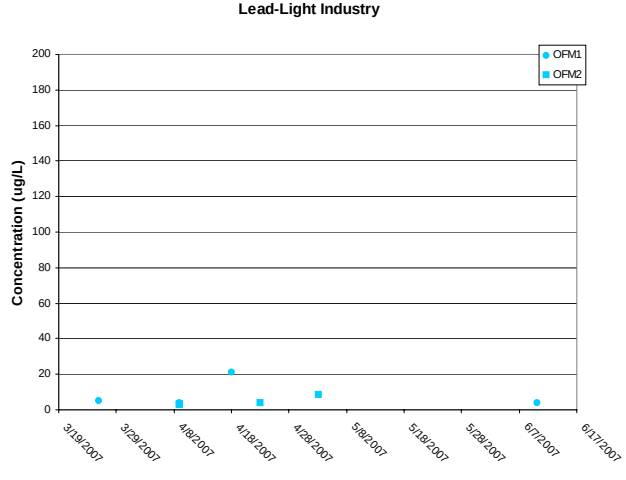
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

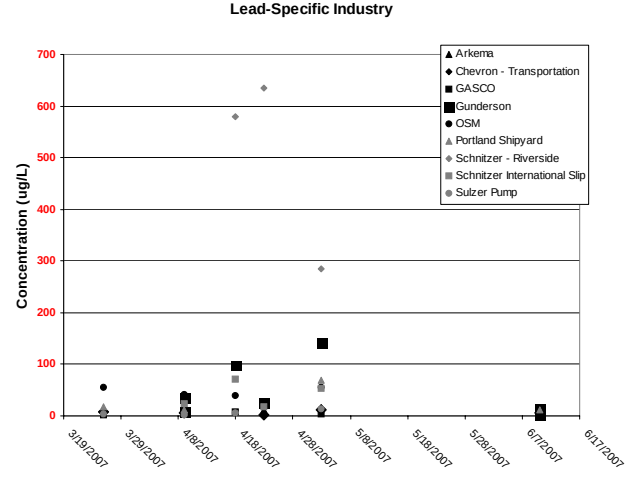




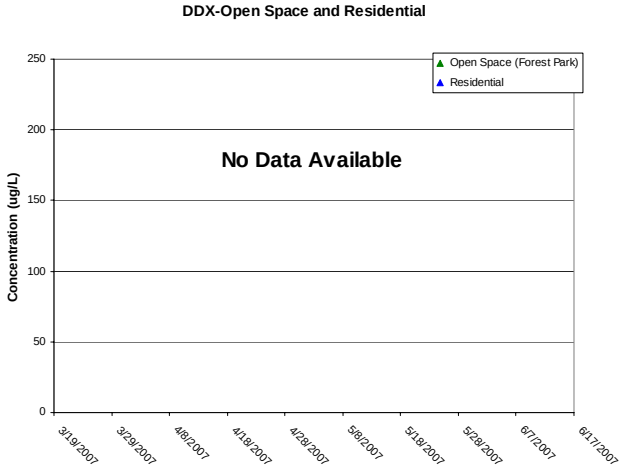


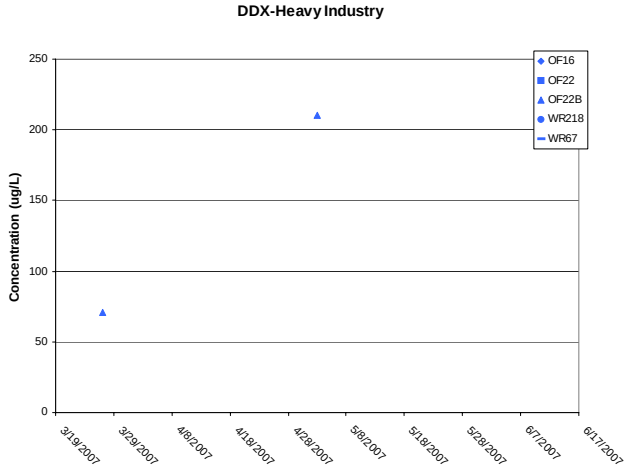


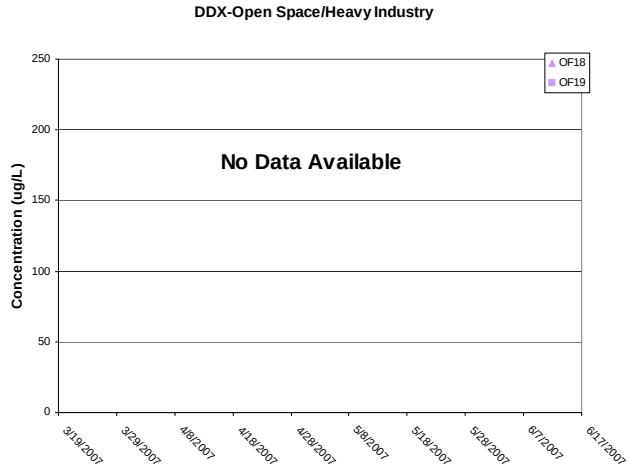


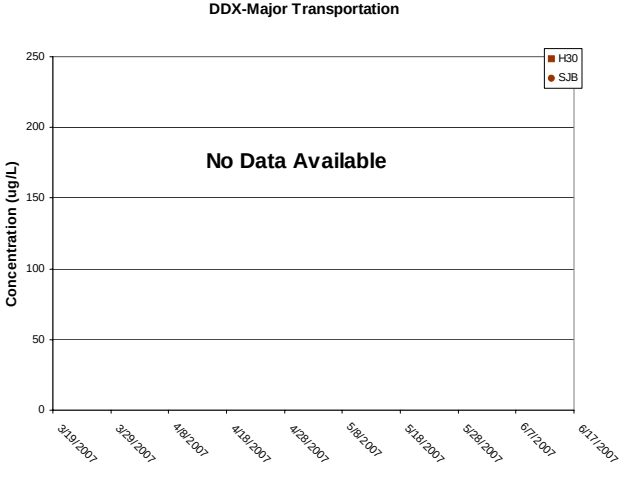


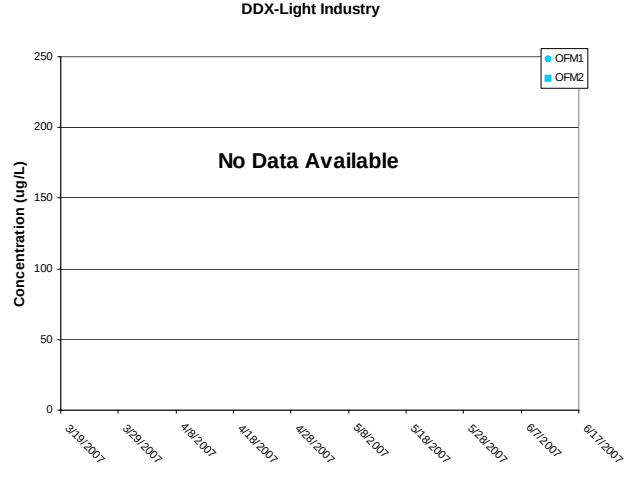
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

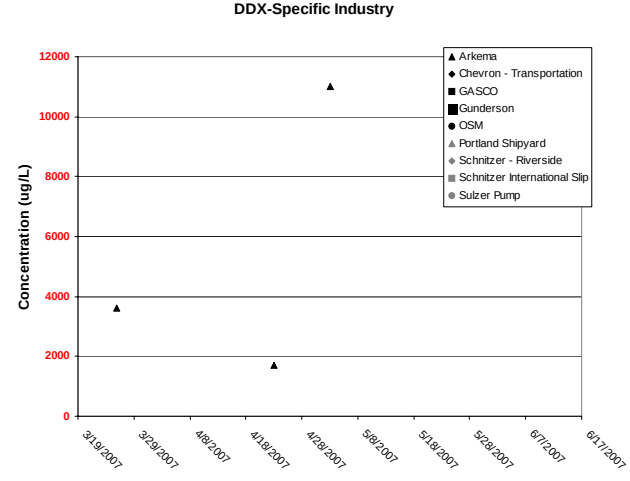












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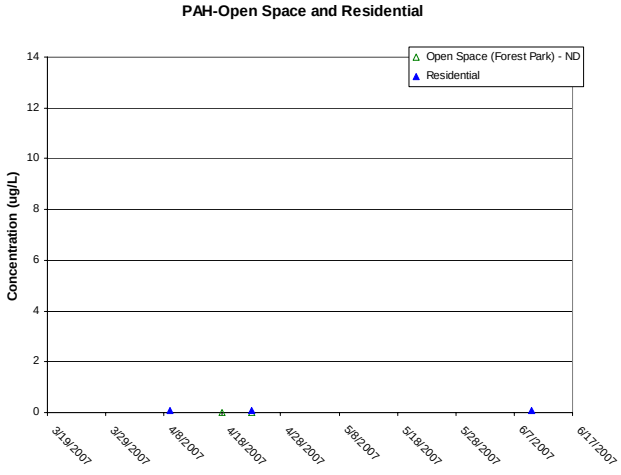
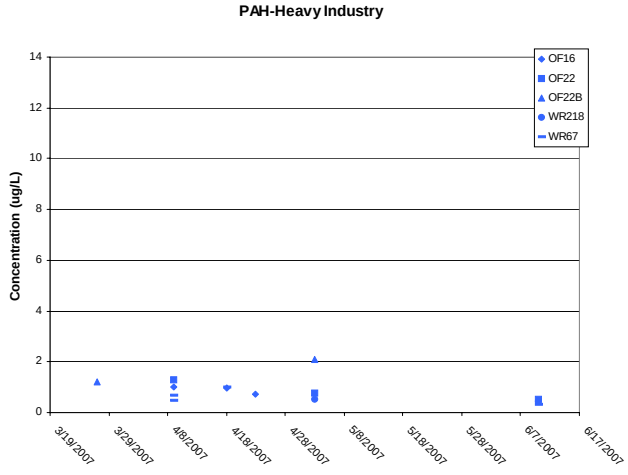
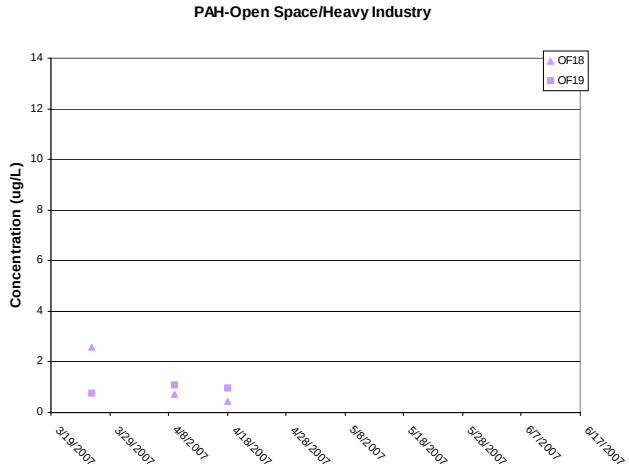
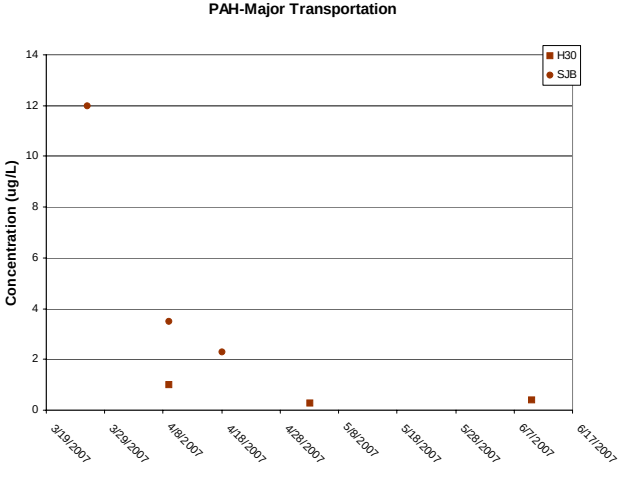
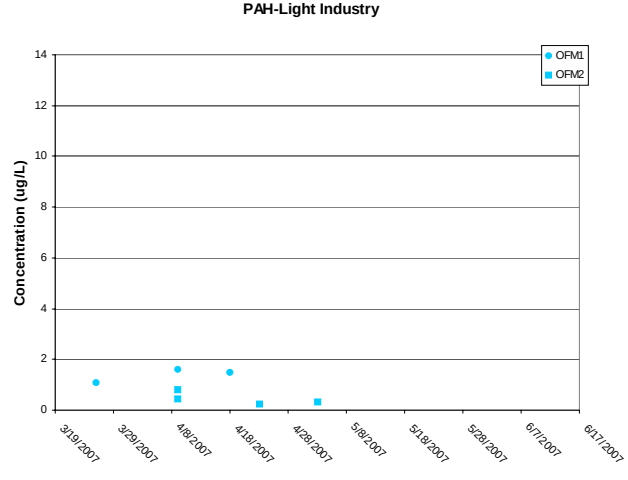
Note: When summed Total is ND (all component concentrations are ND), presented as hollow symbols, the value is substituted with ½ the DL.

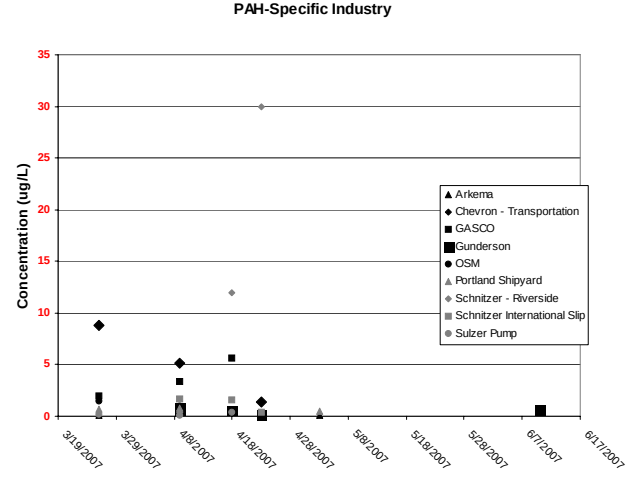












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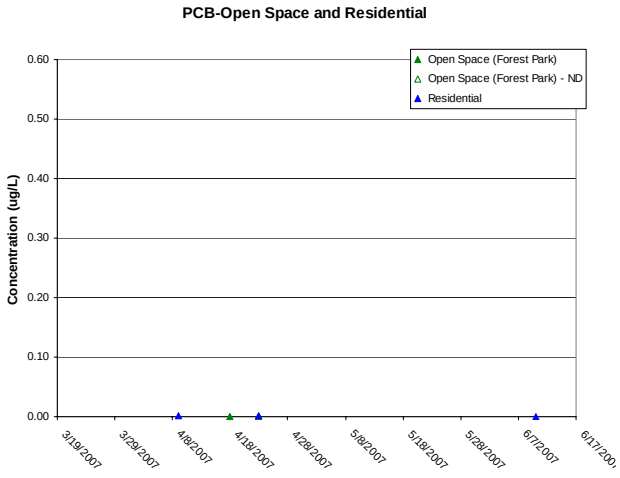

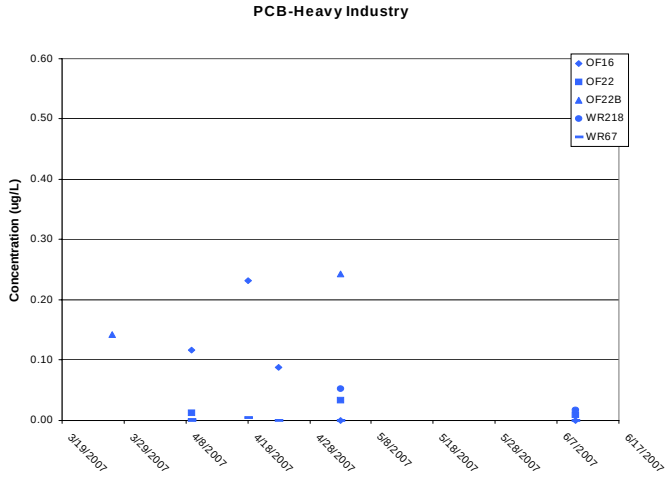

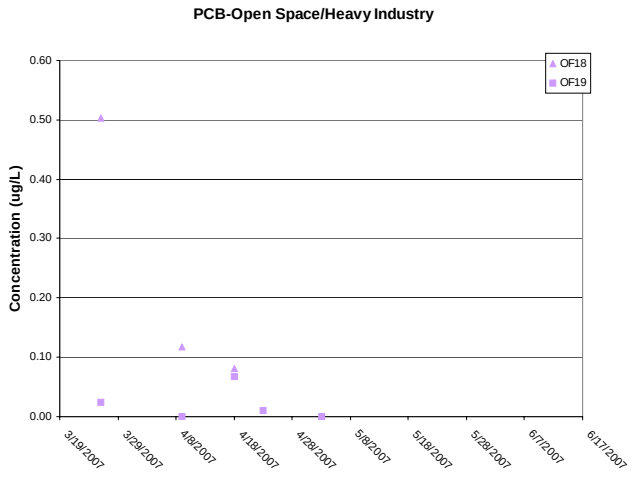

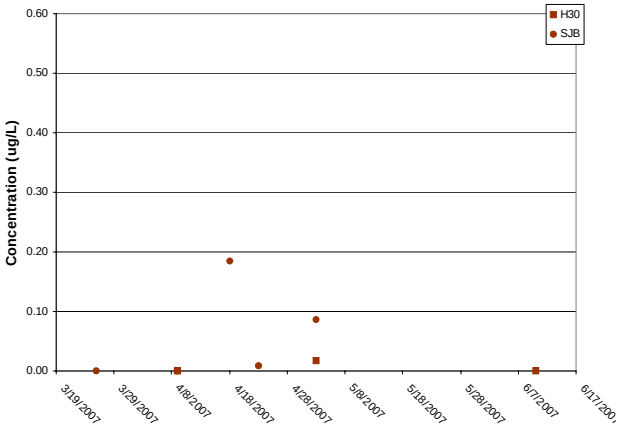

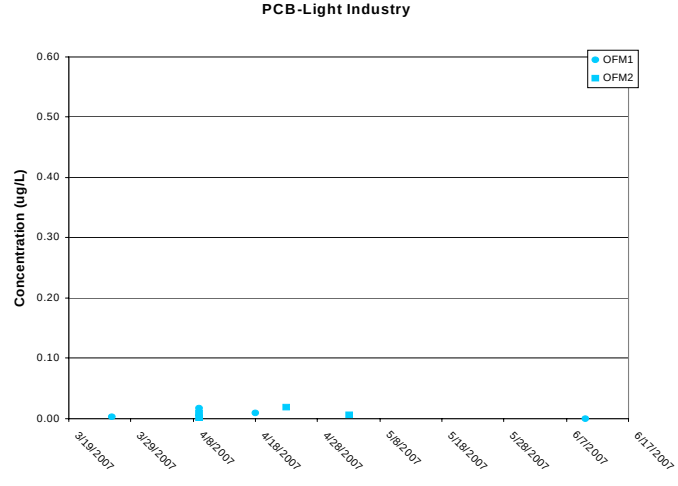

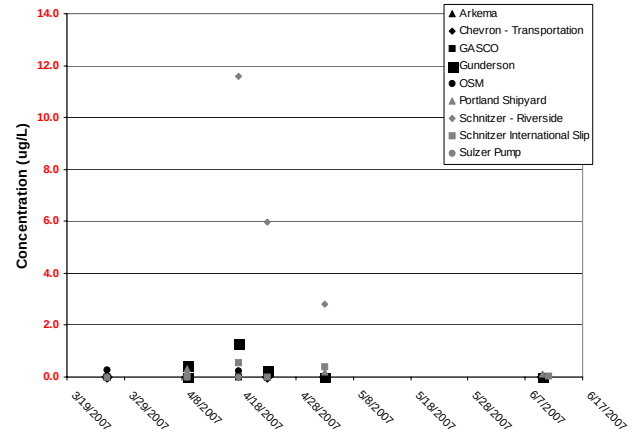

Note: Land Use grouping is based on Stormwater FSP.
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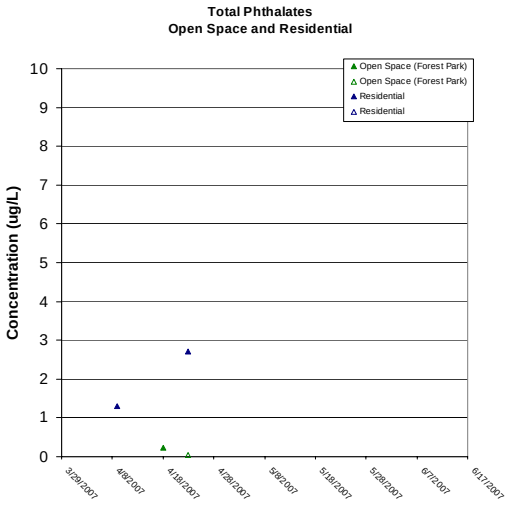

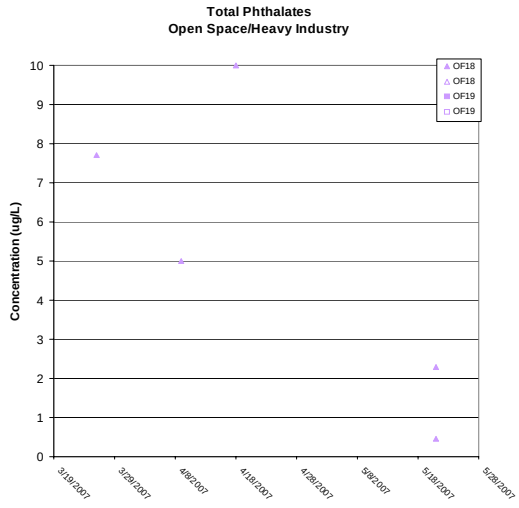

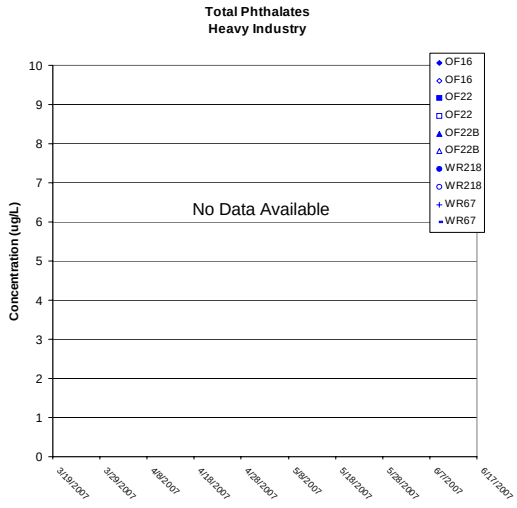

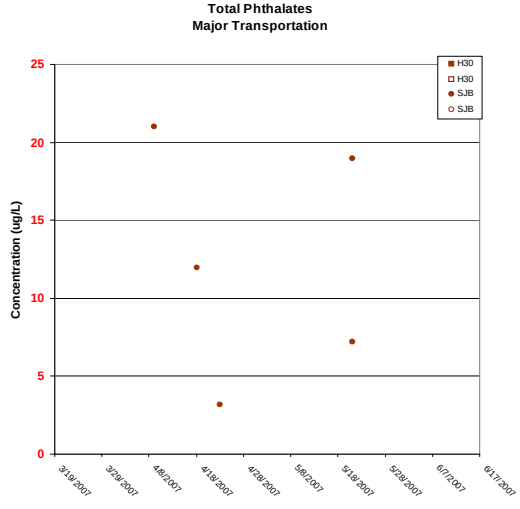

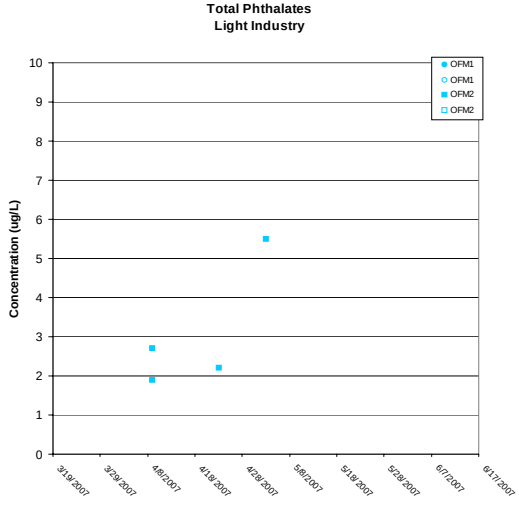

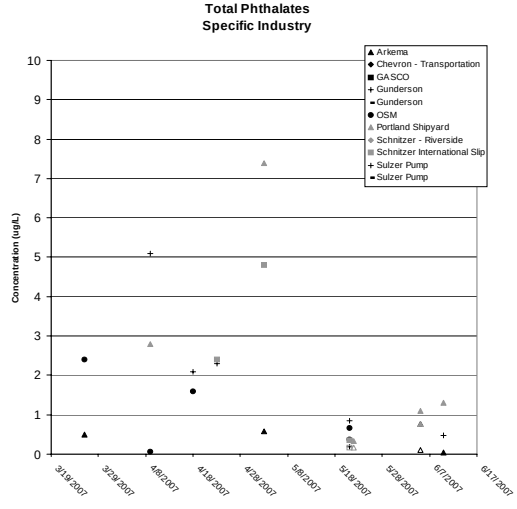

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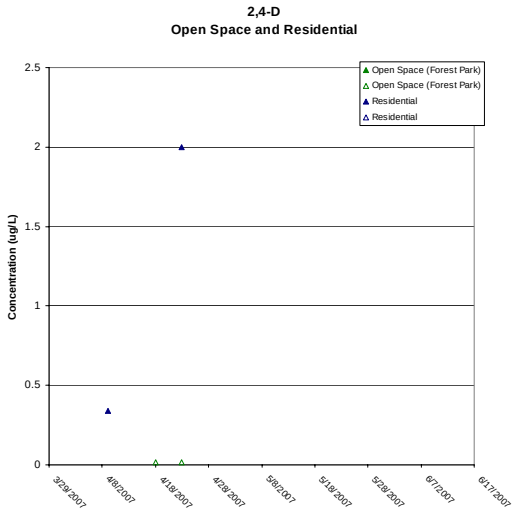
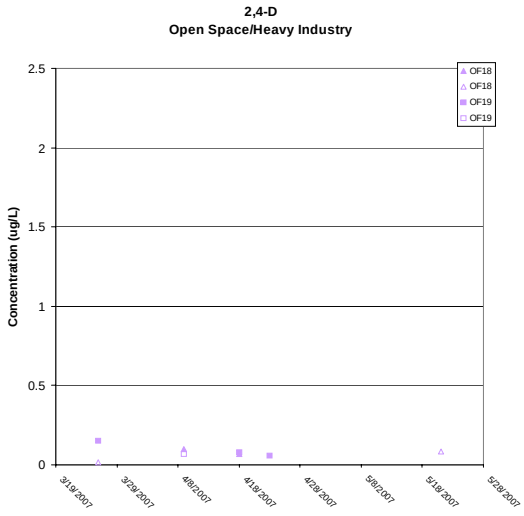
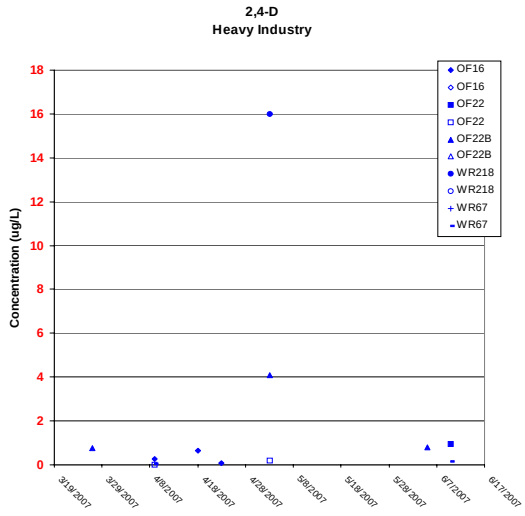
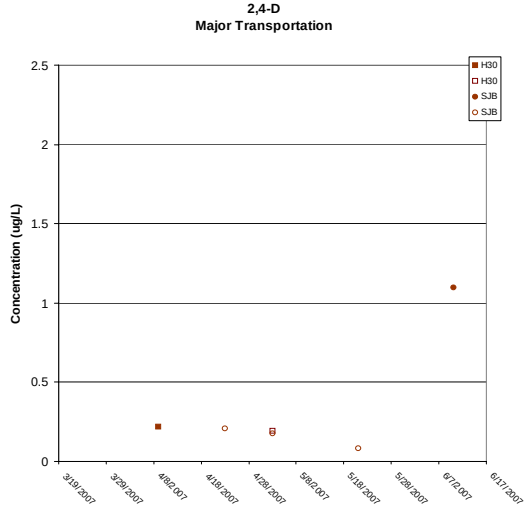
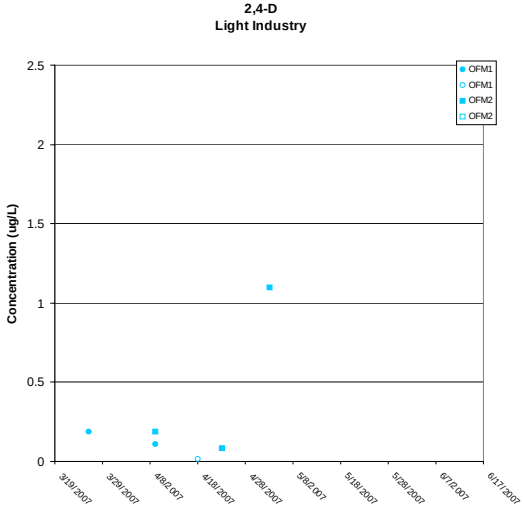
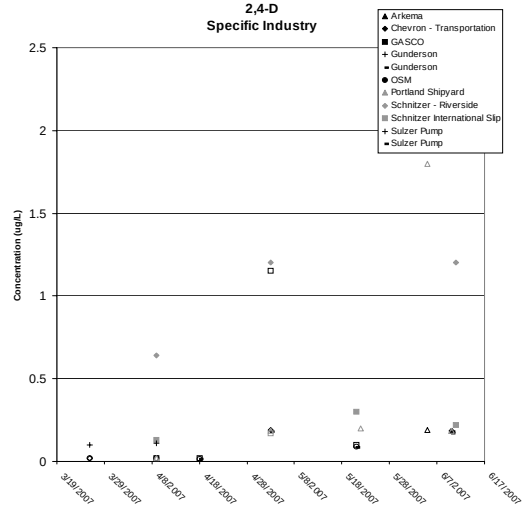






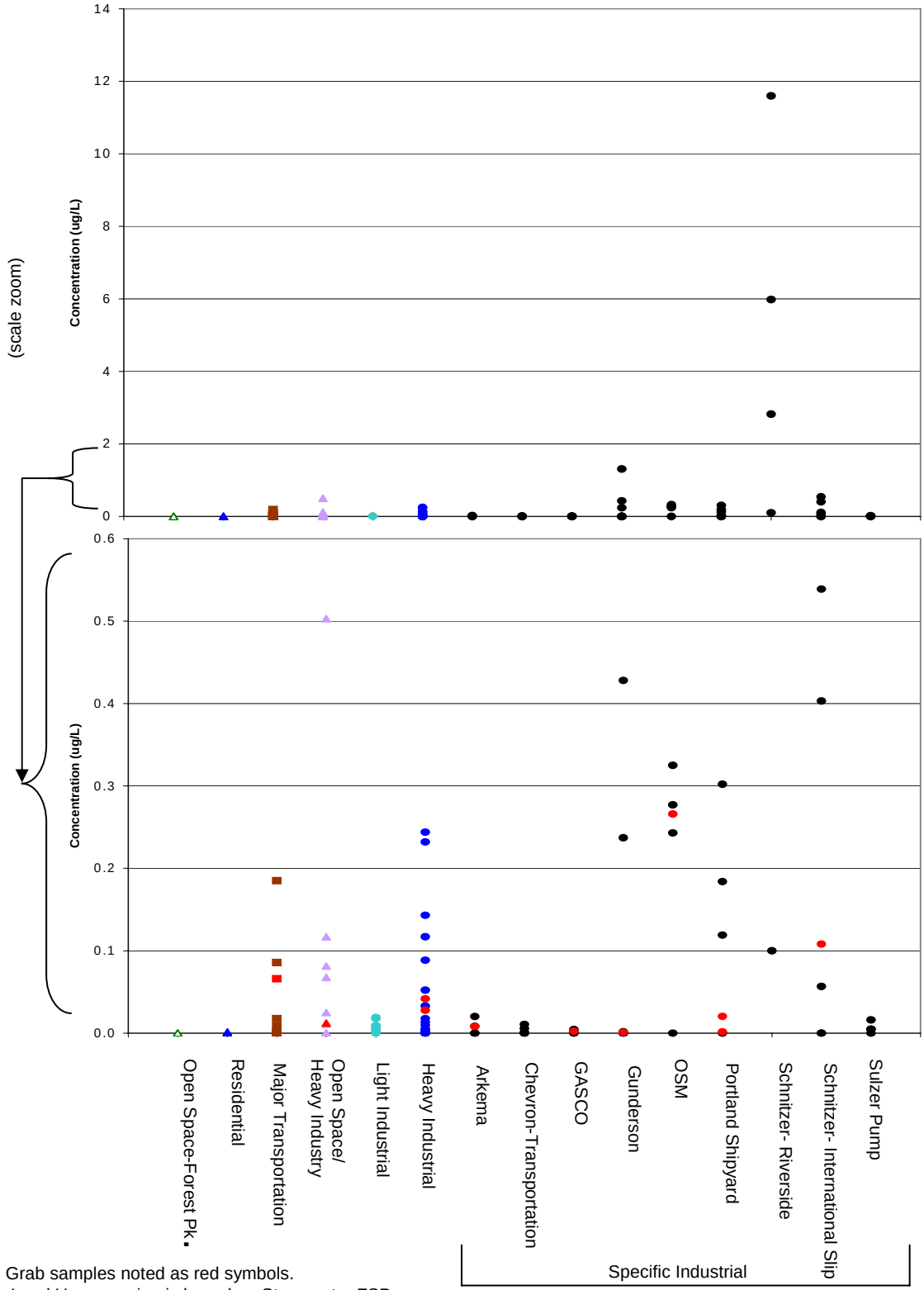






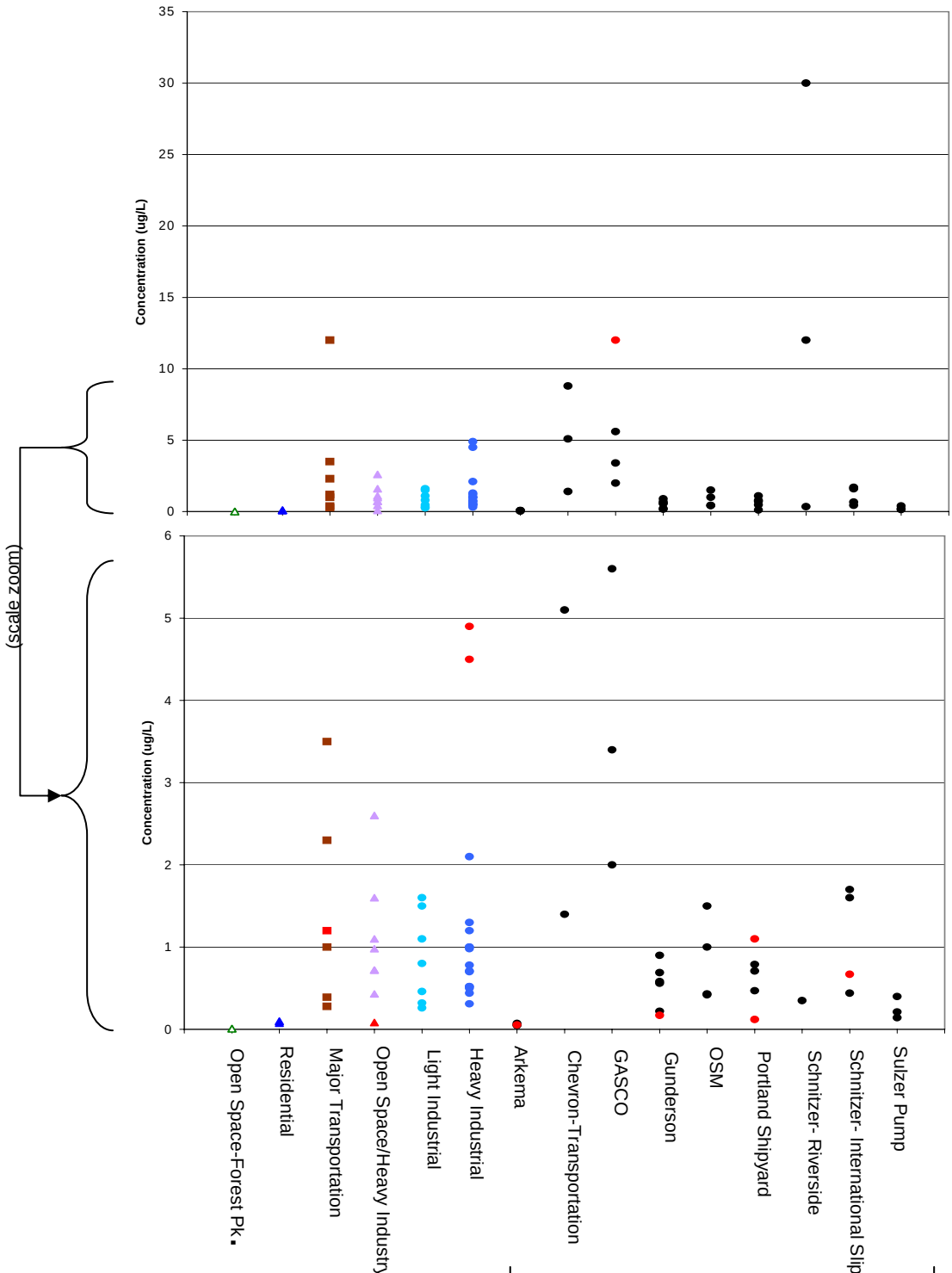
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

Total PCBs



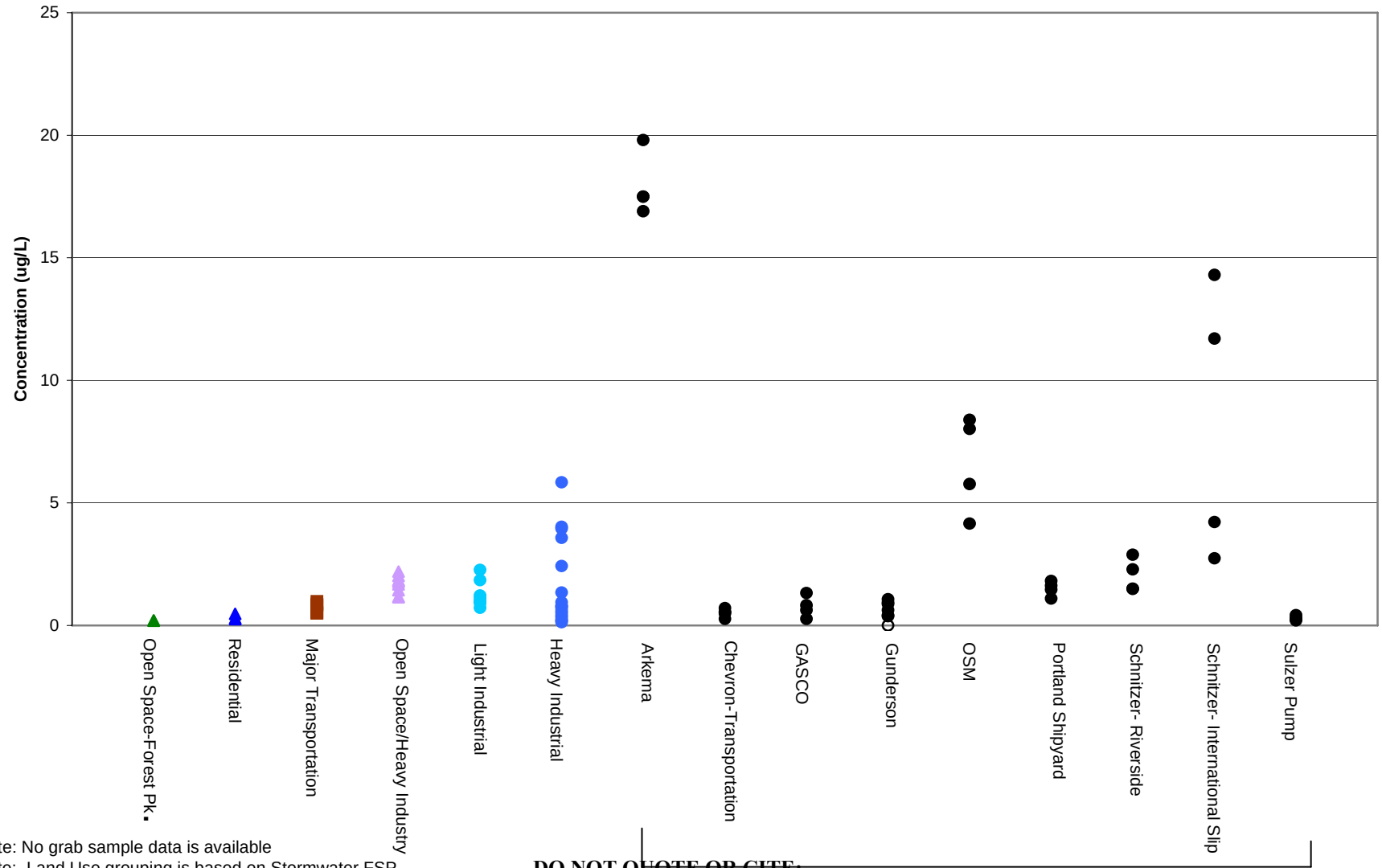
Note: Grab samples noted as red symbols.
Note: Land Use grouping is based on Stormwater FSP.
Note: For the calculation of summed Totals, individual component ND are set to 0.
Note: When summed Total is ND (all component concentrations are ND), presented as hollow symbols, the value is substituted with ½ the DL.

Total PAH



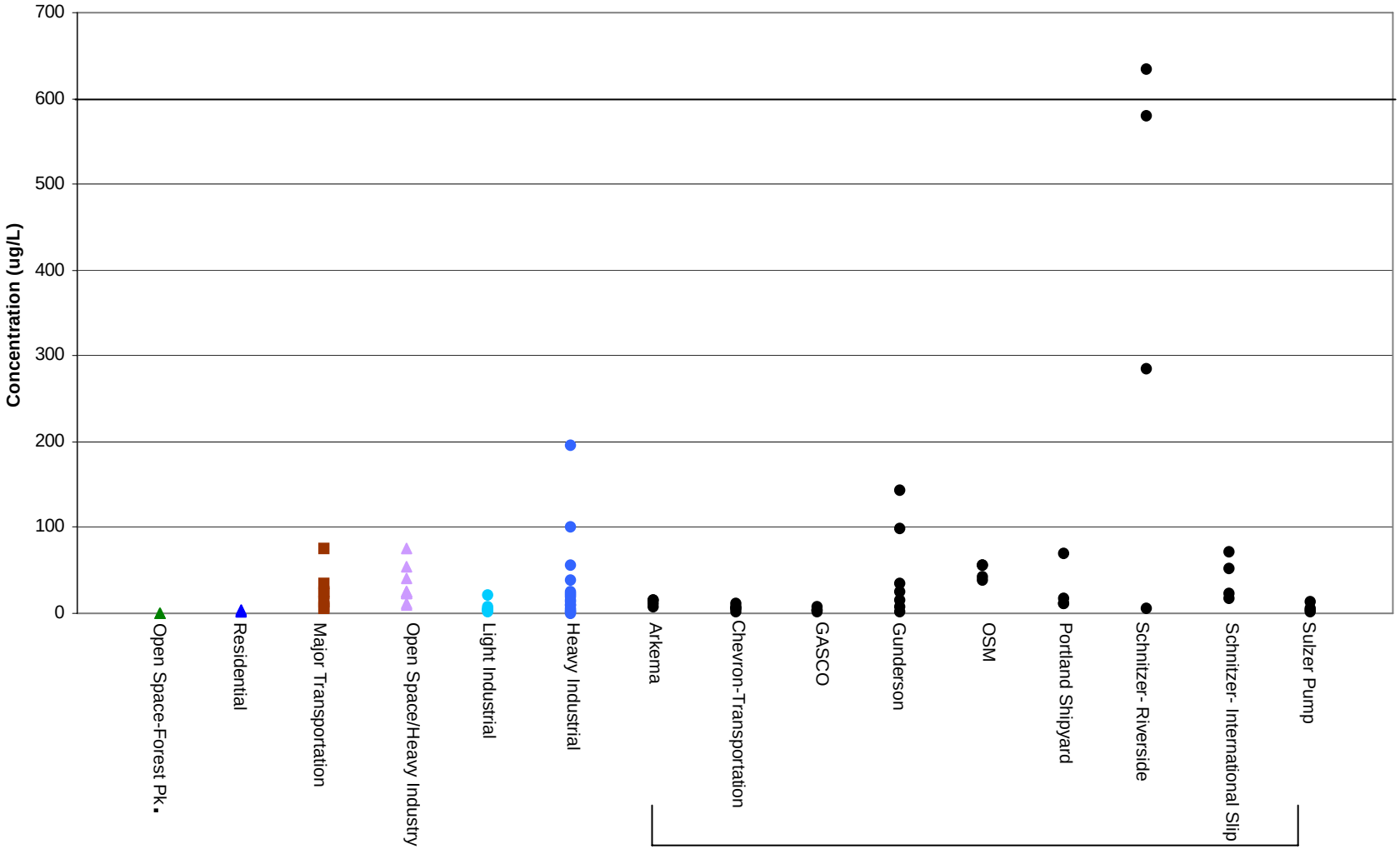
Note: Grab samples noted as red symbols.
Note: Land Use grouping is based on Stormwater FSP.
Note: For the calculation of summed Totals, individual component ND are set to 0.
Note: When summed Total is ND (all component concentrations are ND), presented as hollow symbols, the value is substituted with ½ the DL.

Total Arsenic



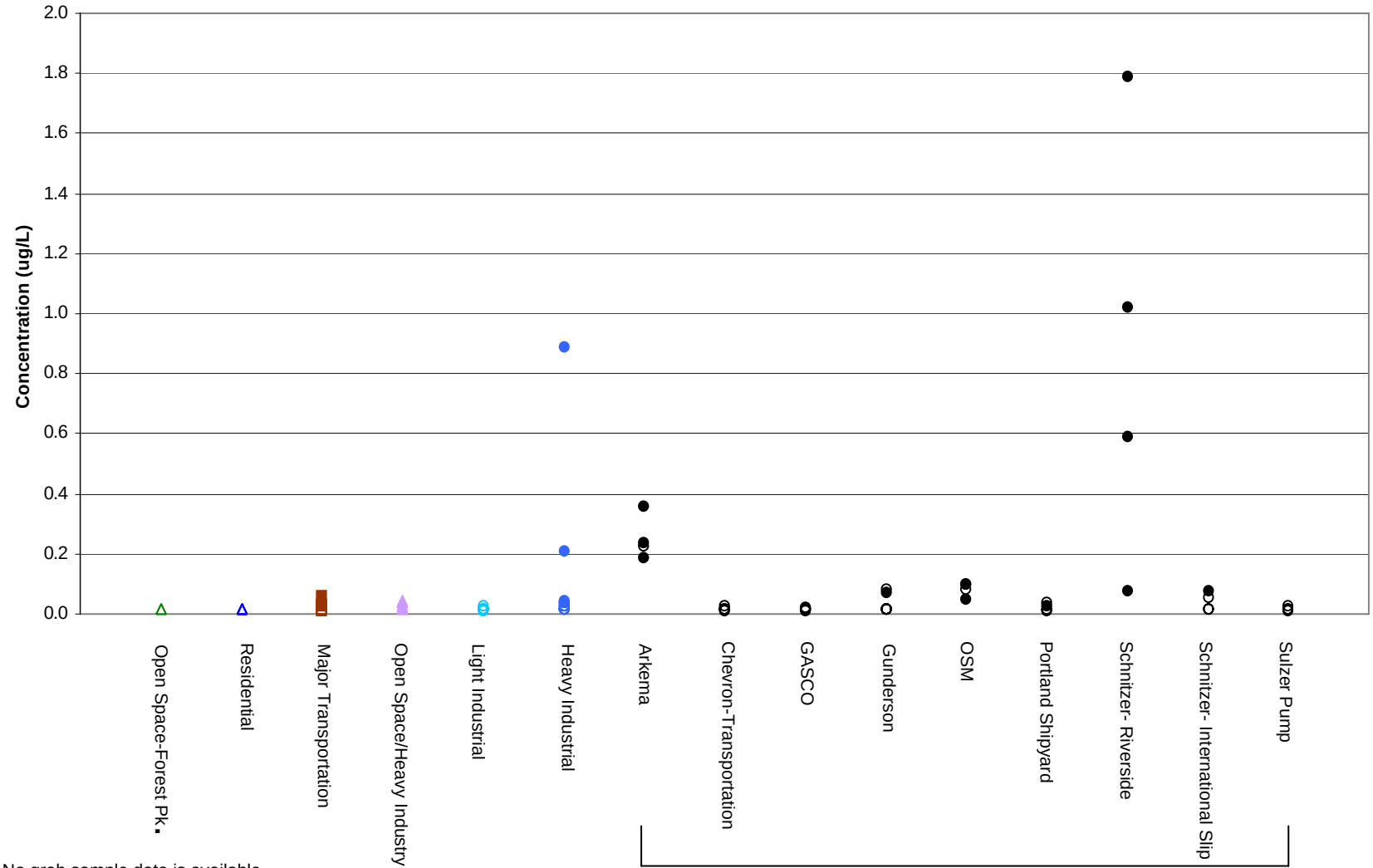
Note: No grab sample data is available
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

Total Lead



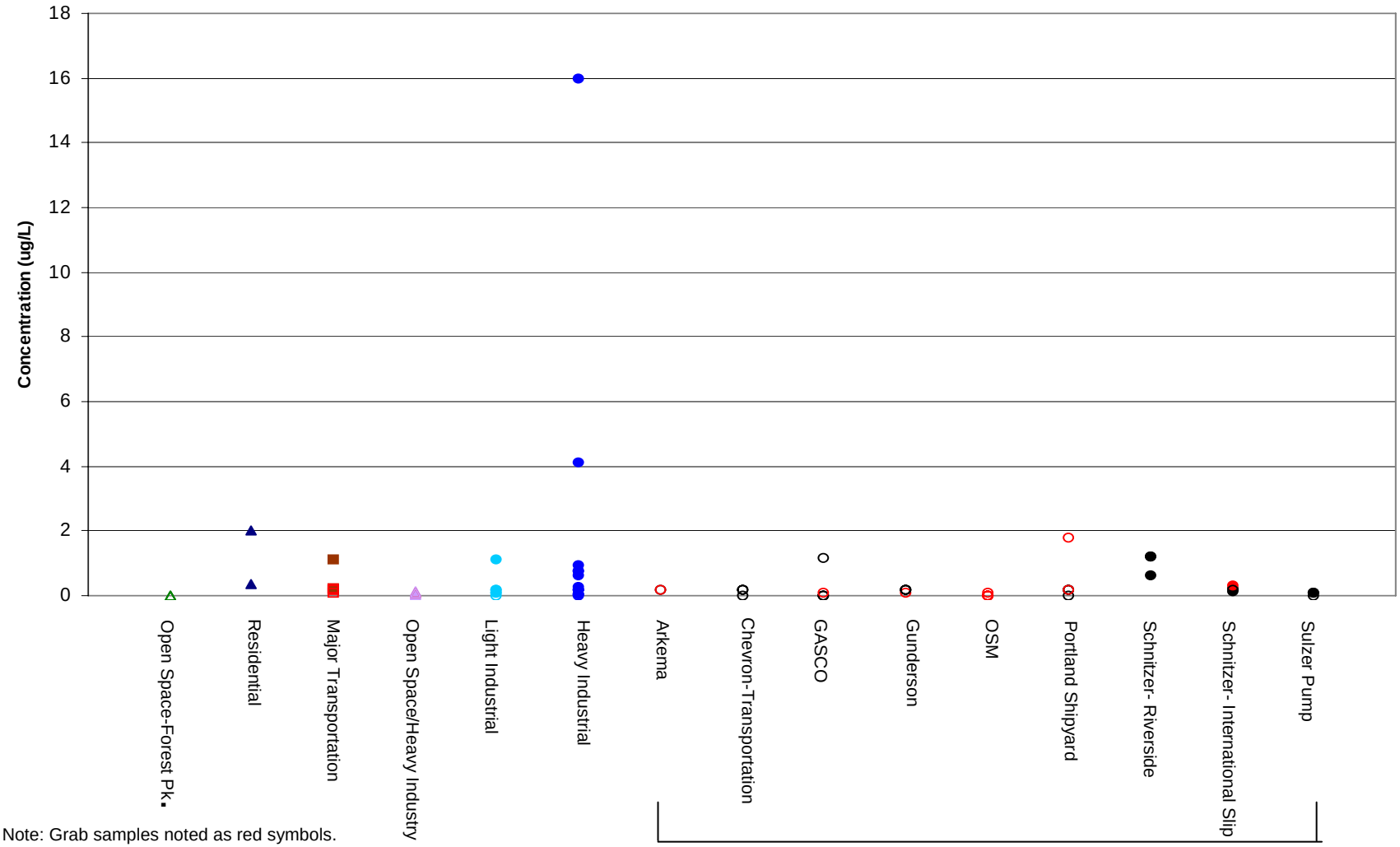
Note: No grab sample data is available
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

Total Mercury



Note: No grab sample data is available
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

2,4-D

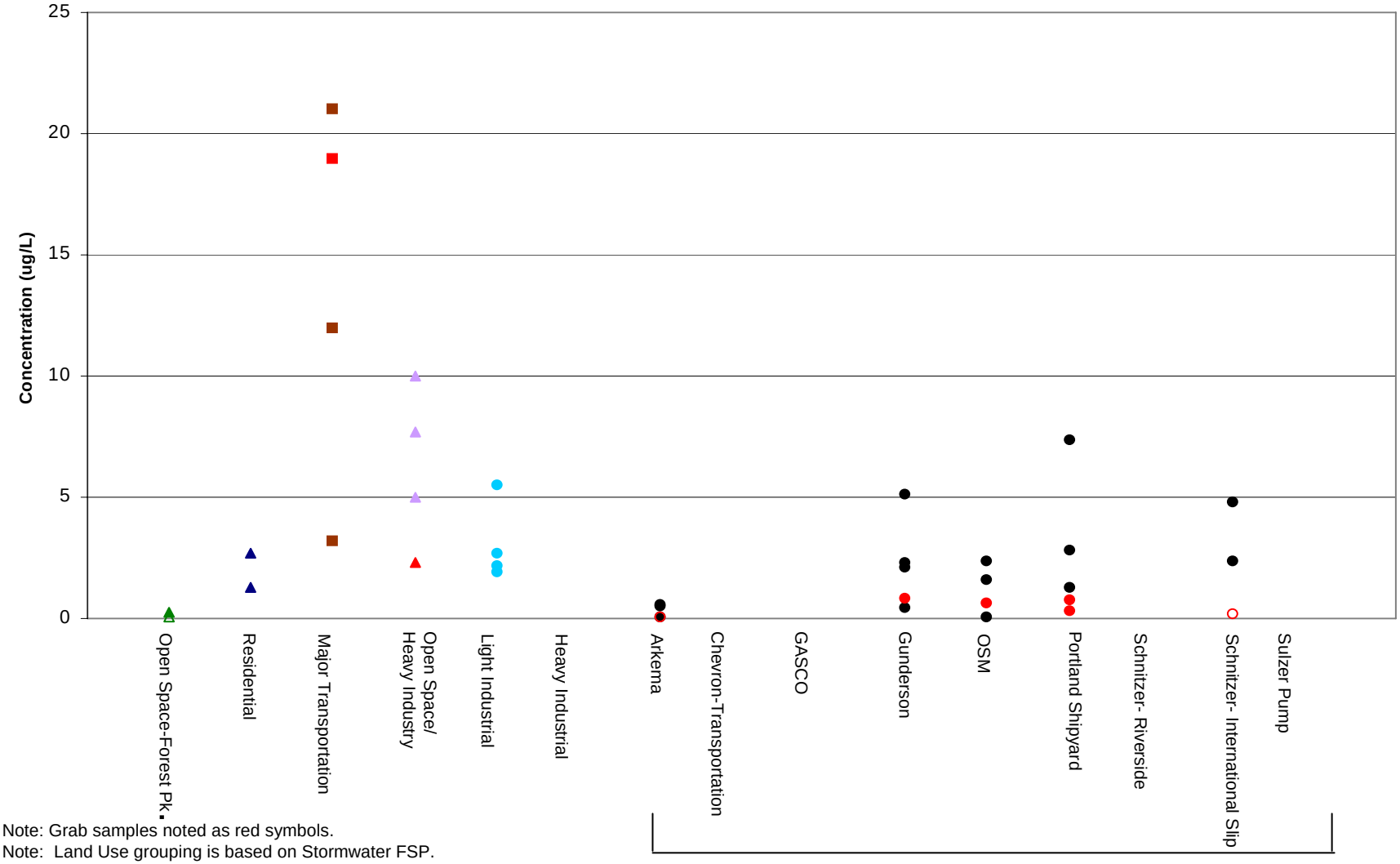


Note: Grab samples noted as red symbols.
Note: Land Use grouping is based on Stormwater FSP.
Note: Non-detects (hollow symbols) substituted at ½ the detection limit.

DO NOT QUOTE OR CITE: Specific Industrial

This document is currently under review by US EPA and its federal, state and tribal partners, and is subject to change in whole or in part.

Total Phthalates



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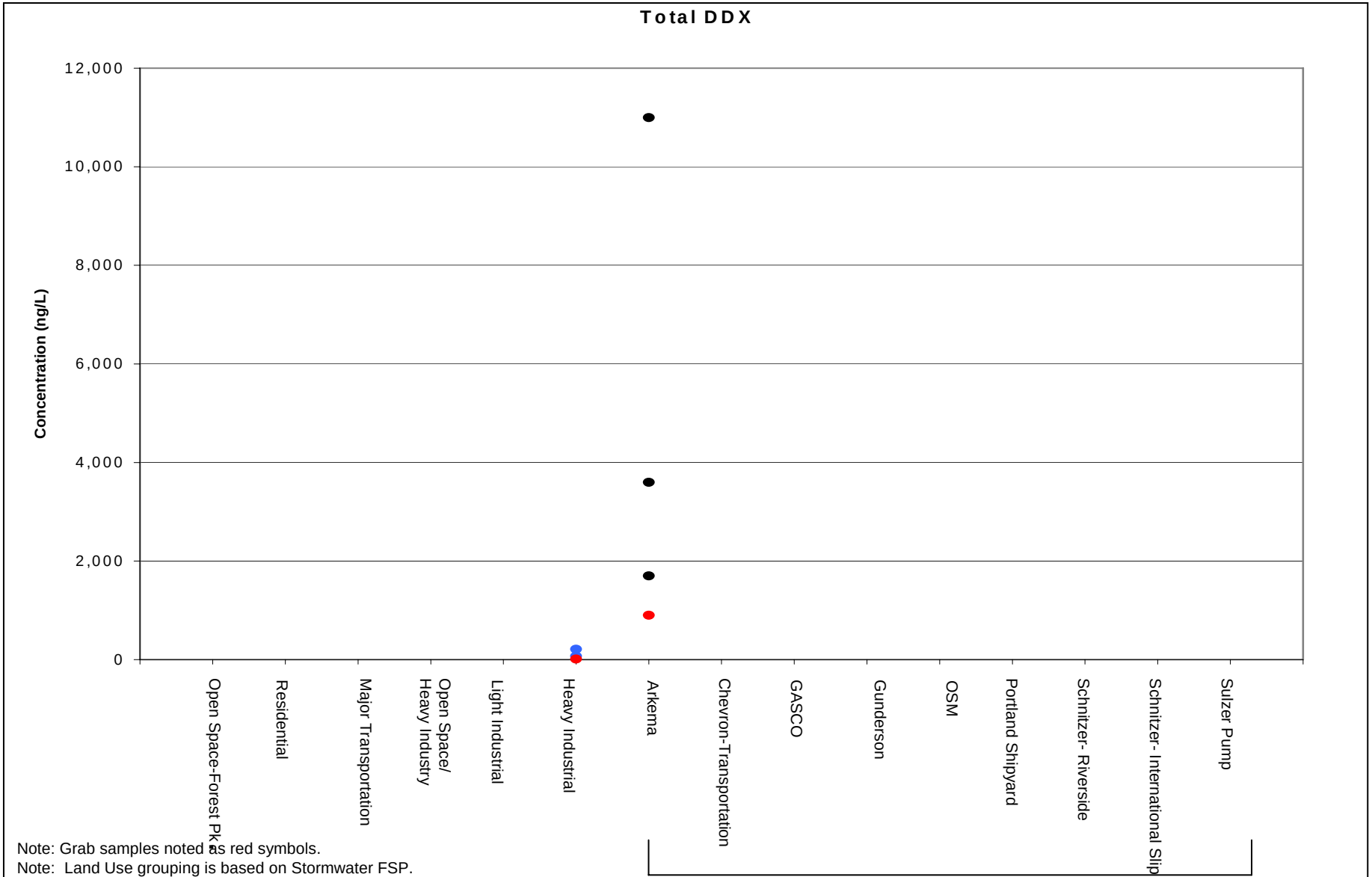

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October 12, 2007 Stormwater Technical Team Call October 16 at 1:00 pm

From: Carl Stivers
Sent: Fri 10/12/2007 2:46 PM
To: Carl Stivers; 'Koch.Kristine@epamail.epa.gov'; 'Andy Koulermos'; Amanda Shellenberger; 'Amanda Spencer'; 'Sanders, Dawn'; 'Scheffler, Linda'; 'Laura Jones'; 'mcoover@ensr.aecom.com'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: Bob Wyatt; Rick Applegate; 'MCCLINCY Matt'; Jessica Pisano; 'Gene Revelas'; 'Christine Hawley'; Jim McKenna
Subject: RE: Stormwater Technical Team Call October 16 at 1:00 pm

Stormwater Technical Team –

Here is the final table for our next meeting, as mentioned in my earlier email. Thanks.

Carl

Carl Stivers
Anchor Environmental, L.L.C.
23 South Wenatchee Avenue, Suite 120
Wenatchee, WA 98801
Phone: 509-888-2070
Fax: 509-888-2211

cstivers@anchorenv.com

From: Carl Stivers
Sent: Friday, October 12, 2007 10:02 AM
To: 'Koch.Kristine@epamail.epa.gov'; 'Andy Koulermos'; Amanda Shellenberger; 'Amanda Spencer'; 'Sanders, Dawn'; 'Scheffler, Linda'; 'Laura Jones'; 'mcoover@ensr.aecom.com'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: Bob Wyatt; Rick Applegate; 'MCCLINCY Matt'; Jessica Pisano; 'Gene Revelas'; 'Christine Hawley'; Jim McKenna
Subject: RE: Stormwater Technical Team Call October 16 at 1:00 pm

Stormwater Technical Team –

<< File: Elements of Loading Analysis Oct 12.doc >> << File: 20071010_summary_stats_tables_only.xls >> << File: 20071011_figures_by_outfall.pdf >> << File: 20071012_figures_by_land_use.pdf >>
Attached are some data summaries to facilitate our next call. In addition, there is a summary of loading estimate calculation method options that was also requested by the team.

-Remaining text deleted-

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total PCBs								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	80.8	80.8	80.8	JT	pg/L
			LW3-STW-CW20-OF22C	52.4	26.2	0	UT	pg/L
	Residential	OF49	LW3-STW-CW10-OF49	1140	1140	1140	JT	pg/L
			LW3-STW-CW20-OF49	1220	1220	1220	JT	pg/L
	Major Transportation	H30	LW3-STW-CW20-H30	17500	17500	17500	JT	pg/L
		SJB	LW3-STW-CW30-SJB	185000	185000	185000	JT	pg/L
			LW3-STW-CW40-SJB	8500	8500	8500	T	pg/L
			LW3-STW-CW50-SJB	85700	85700	85700	JT	pg/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	503000	503000	503000	T	pg/L
			LW3-STW-CW20-OF18	117000	117000	117000	JT	pg/L
			LW3-STW-CW30-OF18	81400	81400	81400	JT	pg/L
		OF19	LW3-STW-CW10-OF19	25000	25000	25000	JT	pg/L
			LW3-STW-CW30-OF19	67700	67700	67700	T	pg/L
			LW3-STW-CW40-OF19	11100	11100	11100	JT	pg/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	3490	3490	3490	JT	pg/L
			LW3-STW-CW20-OFM1	17800	17800	17800	JT	pg/L
			LW3-STW-CW30-OFM1	9040	9040	9040	JT	pg/L
		OFM2	LW3-STW-CW10-OFM2	9160	9160	9160	JT	pg/L
			LW3-STW-CW20-OFM2	1700	1700	1700	JT	pg/L
			LW3-STW-CW30-OFM2	19100	19100	19100	JT	pg/L
			LW3-STW-CW40-OFM2	5880	5880	5880	JT	pg/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	117000	117000	117000	T	pg/L
			LW3-STW-CW20-OF16	232000	232000	232000	T	pg/L
			LW3-STW-CW30-OF16	88500	88500	88500	JT	pg/L
		OF22	LW3-STW-CW10-OF22	13200	13200	13200	JT	pg/L
			LW3-STW-CW20-OF22	33000	33000	33000	JT	pg/L
			LW3-STW-CW30-OF22	9380	9380	9380	JT	pg/L
		OF22B	LW3-STW-CW10-OF22B	143000	143000	143000	T	pg/L
			LW3-STW-CW20-OF22B	244000	244000	244000	JT	pg/L
		WR218	LW3-STW-CW10-WR218	52100	52100	52100	JT	pg/L
			LW3-STW-CW20-WR218	17600	17600	17600	JT	pg/L
		WR67	LW3-STW-CW20-WR67	913	913	913	JT	pg/L
			LW3-STW-CW30-WR67	4950	4950	4950	JT	pg/L
			LW3-STW-CW40-WR67	550	550	550	T	pg/L
			LW3-STW-CW60-WR67	344	344	344	JT	pg/L
	Arkema	WR96	LW3-STW-CW30-WR96	20200	20200	20200	JT	pg/L
			LW3-STW-CW40-WR96	8340	8340	8340	JT	pg/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	5520	5520	5520	JT	pg/L
			LW3-STW-CW30-WR14	971	971	971	JT	pg/L
			LW3-STW-CW40-WR14	10600	10600	10600	JT	pg/L
	GASCO	WR107	LW3-STW-CW20-WR107	510	510	510	JT	pg/L
			LW3-STW-CW30-WR107	2620	2620	2620	JT	pg/L
			LW3-STW-CW40-WR107	4420	4420	4420	JT	pg/L
	Gunderson	WR142	LW3-STW-CW10-WR142	1600	1600	1600	JT	pg/L
		WR147	LW3-STW-CW10-WR147	428000	428000	428000	JT	pg/L
			LW3-STW-CW20-WR147	1310000	1310000	1310000	T	pg/L
			LW3-STW-CW30-WR147	237000	237000	237000	T	pg/L
	OSM	WR22	LW3-STW-CW10-WR22	277000	277000	277000	T	pg/L
			LW3-STW-CW20-WR22	325000	325000	325000	T	pg/L
			LW3-STW-CW30-WR22	243000	243000	243000	T	pg/L
	Portland Shipyard	WR161	LW3-STW-CW20-WR161	302000	302000	302000	JT	pg/L
			LW3-STW-CW30-WR161	184000	184000	184000	JT	pg/L
			LW3-STW-CW40-WR161	119000	119000	119000	JT	pg/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	100000	100000	100000	JT	pg/L
			LW3-STW-CW20-WR384	11600000	11600000	11600000	JT	pg/L
			LW3-STW-CW30-WR384	5980000	5980000	5980000	T	pg/L
			LW3-STW-CW40-WR384	2820000	2820000	2820000	T	pg/L
	Schnitzer International Slip	WR123	LW3-STW-CW20-WR123	539000	539000	539000	T	pg/L
			LW3-STW-CW40-WR123	403000	403000	403000	JT	pg/L
			LW3-STW-CW50-WR123	56700	56700	56700	T	pg/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	4860	4860	4860	JT	pg/L
			LW3-STW-CW20-WR4	4820	4820	4820	JT	pg/L
			LW3-STW-CW30-WR4	16100	16100	16100	JT	pg/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total suspended solids								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	10	10	10		mg/L
			LW3-STW-CW20-OF22C	10	10	10		mg/L
	Residential	OF49	LW3-STW-CW10-OF49	8	8	8		mg/L
			LW3-STW-CW20-OF49	16	16	16		mg/L
			LW3-STW-CW30-OF49	38	38	38		mg/L
	Major Transportation	H30	LW3-STW-CW10-H30	47	47	47		mg/L
			LW3-STW-CW20-H30	60	60	60		mg/L
			LW3-STW-CW30-H30	33	33	33		mg/L
		SJB	LW3-STW-CW10-SJB	223	223	223		mg/L
			LW3-STW-CW20-SJB	85	85	85		mg/L
			LW3-STW-CW30-SJB	248	248	248		mg/L
			LW3-STW-CW40-SJB	13	13	13		mg/L
			LW3-STW-CW50-SJB	82	82	82		mg/L
			LW3-STW-CW60-SJB	45	45	45		mg/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	137	137	137		mg/L
			LW3-STW-CW20-OF18	94	94	94		mg/L
			LW3-STW-CW30-OF18	113	113	113		mg/L
			LW3-STW-CW40-OF18	212	212	212		mg/L
		OF19	LW3-STW-CW10-OF19	81	81	81		mg/L
			LW3-STW-CW20-OF19	56	56	56		mg/L
			LW3-STW-CW30-OF19	151	151	151		mg/L
			LW3-STW-CW40-OF19	34	34	34		mg/L
			LW3-STW-CW50-OF19	191	191	191		mg/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	52	52	52		mg/L
			LW3-STW-CW20-OFM1	46	46	46		mg/L
			LW3-STW-CW30-OFM1	97	97	97		mg/L
			LW3-STW-CW40-OFM1	73	73	73		mg/L
		OFM2	LW3-STW-CW10-OFM2	54	54	54		mg/L
			LW3-STW-CW20-OFM2	31	31	31		mg/L
			LW3-STW-CW30-OFM2	39	39	39		mg/L
			LW3-STW-CW40-OFM2	81	81	81		mg/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	50	50	50		mg/L
			LW3-STW-CW20-OF16	171	171	171		mg/L
			LW3-STW-CW30-OF16	34	34	34		mg/L
			LW3-STW-CW40-OF16	114	114	114		mg/L
			LW3-STW-CW50-OF16	78	78	78		mg/L
		OF22	LW3-STW-CW10-OF22	182	182	182		mg/L
			LW3-STW-CW20-OF22	103	103	103		mg/L
			LW3-STW-CW30-OF22	69	69	69		mg/L
		OF22B	LW3-STW-CW10-OF22B	164	164	164		mg/L
			LW3-STW-CW20-OF22B	266	266	266		mg/L
		WR218	LW3-STW-CW10-WR218	77	77	77		mg/L
			LW3-STW-CW20-WR218	28	28	28		mg/L
		WR67	LW3-STW-CW10-WR67	22	22	22		mg/L
			LW3-STW-CW20-WR67	14	14	14		mg/L
			LW3-STW-CW30-WR67	49	49	49		mg/L
			LW3-STW-CW40-WR67	15	15	15		mg/L
			LW3-STW-CW50-WR67	59	59	59		mg/L
			LW3-STW-CW60-WR67	6	6	6		mg/L
	Arkema	WR96	LW3-STW-CW10-WR96	5	5	5		mg/L
			LW3-STW-CW20-WR96	6	6	6		mg/L
			LW3-STW-CW30-WR96	20	20	20		mg/L
			LW3-STW-CW40-WR96	11	11	11		mg/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	51	51	51		mg/L
			LW3-STW-CW20-WR14	40	40	40		mg/L
			LW3-STW-CW30-WR14	12	12	12		mg/L
			LW3-STW-CW40-WR14	47	47	47		mg/L
			LW3-STW-CW50-WR14	42	42	42		mg/L
	GASCO	WR107	LW3-STW-CW10-WR107	10	10	10		mg/L
			LW3-STW-CW20-WR107	20	20	20		mg/L
			LW3-STW-CW30-WR107	28	28	28		mg/L
			LW3-STW-CW40-WR107	36	36	36		mg/L
	Gunderson	WR142	LW3-STW-CW10-WR142	8	8	8		mg/L
		WR145	LW3-STW-CW10-WR145	9	9	9		mg/L
		WR147	LW3-STW-CW10-WR147	28	28	28		mg/L
			LW3-STW-CW20-WR147	60	60	60		mg/L
			LW3-STW-CW30-WR147	19	19	19		mg/L
			LW3-STW-CW40-WR147	119	119	119		mg/L
			LW3-STW-CW50-WR147	15	15	15		mg/L
	OSM	WR22	LW3-STW-CW10-WR22	146	146	146		mg/L
			LW3-STW-CW20-WR22	143	143	143		mg/L
			LW3-STW-CW30-WR22	128	128	128		mg/L
			LW3-STW-CW40-WR22	221	221	221		mg/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	23	23	23		mg/L
			LW3-STW-CW20-WR161	22	22	22		mg/L
			LW3-STW-CW30-WR161	256	256	256		mg/L
			LW3-STW-CW40-WR161	117	117	117		mg/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	6	6	6		mg/L
			LW3-STW-CW20-WR384	780	780	780		mg/L
			LW3-STW-CW30-WR384	64	64	64		mg/L
			LW3-STW-CW40-WR384	167	167	167		mg/L
			LW3-STW-CW50-WR384	304	304	304		mg/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	143	143	143		mg/L
			LW3-STW-CW20-WR123	366	366	366		mg/L
			LW3-STW-CW30-WR123	89	89	89		mg/L
			LW3-STW-CW40-WR123	317	317	317		mg/L
			LW3-STW-CW50-WR123	58	58	58		mg/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	11	11	11		mg/L
			LW3-STW-CW20-WR4	5	5	5		mg/L
			LW3-STW-CW30-WR4	16	16	16		mg/L
			LW3-STW-CW40-WR4	24	24	24		mg/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total organic carbon								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	2.8	2.8	2.8		mg/L
			LW3-STW-CW20-OF22C	3.3	3.3	3.3		mg/L
	Residential	OF49	LW3-STW-CW10-OF49	6.8	6.8	6.8		mg/L
			LW3-STW-CW20-OF49	5.7	5.7	5.7		mg/L
			LW3-STW-CW30-OF49	15.6	15.6	15.6		mg/L
	Major Transportation	H30	LW3-STW-CW10-H30	13.5	13.5	13.5		mg/L
			LW3-STW-CW20-H30	30.6	30.6	30.6		mg/L
			LW3-STW-CW30-H30	15.7	15.7	15.7		mg/L
		SJB	LW3-STW-CW10-SJB	3.9	3.9	3.9		mg/L
			LW3-STW-CW20-SJB	17.3	17.3	17.3		mg/L
			LW3-STW-CW30-SJB	22.3	22.3	22.3		mg/L
			LW3-STW-CW40-SJB	17.2	17.2	17.2		mg/L
			LW3-STW-CW50-SJB	39.5	39.5	39.5		mg/L
			LW3-STW-CW60-SJB	27.9	27.9	27.9		mg/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	4.3	4.3	4.3		mg/L
			LW3-STW-CW20-OF18	6.7	6.7	6.7		mg/L
			LW3-STW-CW30-OF18	7.8	7.8	7.8		mg/L
			LW3-STW-CW40-OF18	12.9	12.9	12.9		mg/L
		OF19	LW3-STW-CW10-OF19	4.1	4.1	4.1		mg/L
			LW3-STW-CW20-OF19	7.2	7.2	7.2		mg/L
			LW3-STW-CW30-OF19	5.9	5.9	5.9		mg/L
			LW3-STW-CW40-OF19	4.7	4.7	4.7		mg/L
			LW3-STW-CW50-OF19	10.1	10.1	10.1		mg/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	6.1	6.1	6.1		mg/L
			LW3-STW-CW20-OFM1	14.1	14.1	14.1		mg/L
			LW3-STW-CW30-OFM1	11	11	11		mg/L
			LW3-STW-CW40-OFM1	13.2	13.2	13.2		mg/L
		OFM2	LW3-STW-CW10-OFM2	6.9	6.9	6.9		mg/L
			LW3-STW-CW20-OFM2	3.2	3.2	3.2		mg/L
			LW3-STW-CW30-OFM2	4.7	4.7	4.7		mg/L
			LW3-STW-CW40-OFM2	11.8	11.8	11.8		mg/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	7.6	7.6	7.6		mg/L
			LW3-STW-CW20-OF16	9.2	9.2	9.2		mg/L
			LW3-STW-CW30-OF16	6.7	6.7	6.7		mg/L
			LW3-STW-CW40-OF16	17.5	17.5	17.5		mg/L
		OF22	LW3-STW-CW10-OF22	7.1	7.1	7.1		mg/L
			LW3-STW-CW20-OF22	13.6	13.6	13.6		mg/L
			LW3-STW-CW30-OF22	10.6	10.6	10.6		mg/L
		OF22B	LW3-STW-CW10-OF22B	14.1	14.1	14.1		mg/L
			LW3-STW-CW20-OF22B	28.3	28.3	28.3		mg/L
		WR218	LW3-STW-CW10-WR218	21.5	21.5	21.5		mg/L
			LW3-STW-CW20-WR218	7.1	7.1	7.1		mg/L
		WR67	LW3-STW-CW10-WR67	8	8	8		mg/L
			LW3-STW-CW20-WR67	4.3	4.3	4.3		mg/L
			LW3-STW-CW30-WR67	6.9	6.9	6.9		mg/L
			LW3-STW-CW40-WR67	9.3	9.3	9.3		mg/L
			LW3-STW-CW50-WR67	15.4	15.4	15.4		mg/L
			LW3-STW-CW60-WR67	11.2	11.2	11.2		mg/L
	Arkema	WR96	LW3-STW-CW10-WR96	4.5	4.5	4.5		mg/L
			LW3-STW-CW20-WR96	5.7	5.7	5.7		mg/L
			LW3-STW-CW30-WR96	30.8	30.8	30.8		mg/L
			LW3-STW-CW40-WR96	8.4	8.4	8.4		mg/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	4.1	4.1	4.1		mg/L
			LW3-STW-CW20-WR14	6.3	6.3	6.3		mg/L
			LW3-STW-CW30-WR14	6.4	6.4	6.4		mg/L
			LW3-STW-CW40-WR14	23.6	23.6	23.6		mg/L
			LW3-STW-CW50-WR14	11.1	11.1	11.1		mg/L
	GASCO	WR107	LW3-STW-CW10-WR107	2.9	2.9	2.9		mg/L
			LW3-STW-CW20-WR107	4.2	4.2	4.2		mg/L
			LW3-STW-CW30-WR107	3.6	3.6	3.6		mg/L
			LW3-STW-CW40-WR107	5.6	5.6	5.6		mg/L
	Gunderson	WR142	LW3-STW-CW10-WR142	22.7	22.7	22.7		mg/L
		WR145	LW3-STW-CW10-WR145	8.1	8.1	8.1		mg/L
		WR147	LW3-STW-CW10-WR147	7.1	7.1	7.1		mg/L
			LW3-STW-CW20-WR147	38.6	38.6	38.6		mg/L
			LW3-STW-CW30-WR147	5.5	5.5	5.5		mg/L
			LW3-STW-CW40-WR147	11.7	11.7	11.7		mg/L
			LW3-STW-CW50-WR147	13.1	13.1	13.1		mg/L
	OSM	WR22	LW3-STW-CW10-WR22	3.2	3.2	3.2		mg/L
			LW3-STW-CW20-WR22	6	6	6		mg/L
			LW3-STW-CW30-WR22	4.2	4.2	4.2		mg/L
			LW3-STW-CW40-WR22	7.6	7.6	7.6		mg/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	4.1	4.1	4.1		mg/L
			LW3-STW-CW20-WR161	8.9	8.9	8.9		mg/L
			LW3-STW-CW30-WR161	14.2	14.2	14.2		mg/L
			LW3-STW-CW40-WR161	13.3	13.3	13.3		mg/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	21.7	21.7	21.7		mg/L
			LW3-STW-CW20-WR384	21.7	21.7	21.7		mg/L
			LW3-STW-CW30-WR384	42.3	42.3	42.3		mg/L
			LW3-STW-CW40-WR384	23.7	23.7	23.7		mg/L
			LW3-STW-CW50-WR384	26.5	26.5	26.5		mg/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	9.2	9.2	9.2		mg/L
			LW3-STW-CW20-WR123	16.1	16.1	16.1		mg/L
			LW3-STW-CW30-WR123	27.5	27.5	27.5		mg/L
			LW3-STW-CW40-WR123	12.1	12.1	12.1		mg/L
			LW3-STW-CW50-WR123	8.8	8.8	8.8		mg/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	2.9	2.9	2.9		mg/L
			LW3-STW-CW20-WR4	5.8	5.8	5.8		mg/L
			LW3-STW-CW30-WR4	4.5	4.5	4.5		mg/L
			LW3-STW-CW40-WR4	11.4	11.4	11.4		mg/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total of 2,4' and 4,4'-DDD, -DDE, -DDT								
	Heavy Industrial	OF22B	LW3-STW-CW10-OF22B	71	71	71	JT	ng/L
			LW3-STW-CW20-OF22B	210	210	210	JT	ng/L
	Arkema	WR96	LW3-STW-CW10-WR96	3600	3600	3600	JT	ng/L
			LW3-STW-CW20-WR96	1700	1700	1700	JT	ng/L
			LW3-STW-CW30-WR96	11000	11000	11000	JT	ng/L
Low Molecular Weight PAH								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.017	0.0085	0	UT	ug/L
			LW3-STW-CW20-OF22C	0.015	0.0075	0	UT	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.019	0.019	0.019	JT	ug/L
			LW3-STW-CW20-OF49	0.019	0.0095	0	UT	ug/L
			LW3-STW-CW30-OF49	0.021	0.021	0.021	JT	ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	0.15	0.15	0.15	JT	ug/L
			LW3-STW-CW20-H30	0.076	0.076	0.076	JT	ug/L
			LW3-STW-CW30-H30	0.071	0.071	0.071	JT	ug/L
		SJB	LW3-STW-CW10-SJB	4.1	4.1	4.1	T	ug/L
			LW3-STW-CW20-SJB	0.79	0.79	0.79	T	ug/L
			LW3-STW-CW30-SJB	0.54	0.54	0.54	JT	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	0.47	0.47	0.47	JT	ug/L
			LW3-STW-CW20-OF18	0.076	0.076	0.076	JT	ug/L
			LW3-STW-CW30-OF18	0.068	0.068	0.068	JT	ug/L
		OF19	LW3-STW-CW10-OF19	0.1	0.1	0.1	JT	ug/L
			LW3-STW-CW20-OF19	0.19	0.19	0.19	JT	ug/L
			LW3-STW-CW30-OF19	0.15	0.15	0.15	JT	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	0.2	0.2	0.2	JT	ug/L
			LW3-STW-CW20-OFM1	0.46	0.46	0.46	T	ug/L
			LW3-STW-CW30-OFM1	0.32	0.32	0.32	JT	ug/L
		OFM2	LW3-STW-CW10-OFM2	0.088	0.088	0.088	JT	ug/L
			LW3-STW-CW20-OFM2	0.12	0.12	0.12	JT	ug/L
			LW3-STW-CW30-OFM2	0.053	0.053	0.053	JT	ug/L
			LW3-STW-CW40-OFM2	0.084	0.084	0.084	JT	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	0.31	0.31	0.31	JT	ug/L
			LW3-STW-CW20-OF16	0.2	0.2	0.2	JT	ug/L
			LW3-STW-CW30-OF16	0.44	0.44	0.44	T	ug/L
		OF22	LW3-STW-CW10-OF22	0.2	0.2	0.2	JT	ug/L
			LW3-STW-CW20-OF22	0.13	0.13	0.13	JT	ug/L
			LW3-STW-CW30-OF22	0.04	0.04	0.04	T	ug/L
		OF22B	LW3-STW-CW10-OF22B	0.51	0.51	0.51	JT	ug/L
			LW3-STW-CW20-OF22B	0.59	0.59	0.59	JT	ug/L
		WR218	LW3-STW-CW10-WR218	0.14	0.14	0.14	JT	ug/L
			LW3-STW-CW20-WR218	0.097	0.097	0.097	JT	ug/L
		WR67	LW3-STW-CW10-WR67	0.097	0.097	0.097	JT	ug/L
			LW3-STW-CW20-WR67	0.073	0.073	0.073	JT	ug/L
			LW3-STW-CW30-WR67	0.16	0.16	0.16	JT	ug/L
			LW3-STW-CW60-WR67	0.067	0.067	0.067	JT	ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	0.018	0.018	0.018	JT	ug/L
			LW3-STW-CW20-WR96	0.0098	0.0098	0.0098	JT	ug/L
			LW3-STW-CW30-WR96	0.0067	0.0067	0.0067	JT	ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	0.69	0.69	0.69	JT	ug/L
			LW3-STW-CW20-WR14	0.45	0.45	0.45	JT	ug/L
			LW3-STW-CW30-WR14	0.19	0.19	0.19	JT	ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	0.2	0.2	0.2	JT	ug/L
			LW3-STW-CW20-WR107	0.43	0.43	0.43	JT	ug/L
			LW3-STW-CW30-WR107	0.48	0.48	0.48	T	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.18	0.18	0.18	JT	ug/L
		WR145	LW3-STW-CW10-WR145	0.2	0.2	0.2	JT	ug/L
		WR147	LW3-STW-CW10-WR147	0.22	0.22	0.22	JT	ug/L
			LW3-STW-CW20-WR147	0.21	0.21	0.21	JT	ug/L
			LW3-STW-CW30-WR147	0.092	0.092	0.092	JT	ug/L
	OSM	WR22	LW3-STW-CW10-WR22	0.68	0.68	0.68	JT	ug/L
			LW3-STW-CW20-WR22	0.24	0.24	0.24	JT	ug/L
			LW3-STW-CW30-WR22	0.14	0.14	0.14	JT	ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	0.18	0.18	0.18	JT	ug/L
			LW3-STW-CW20-WR161	0.22	0.22	0.22	JT	ug/L
			LW3-STW-CW30-WR161	0.21	0.21	0.21	JT	ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	0.091	0.0455	0	UT	ug/L
			LW3-STW-CW20-WR384	1.8	1.8	1.8	JT	ug/L
			LW3-STW-CW30-WR384	1.4	1.4	1.4	JT	ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	0.23	0.23	0.23	JT	ug/L
			LW3-STW-CW20-WR123	0.64	0.64	0.64	JT	ug/L
			LW3-STW-CW30-WR123	0.062	0.062	0.062	JT	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.087	0.087	0.087	JT	ug/L
			LW3-STW-CW20-WR4	0.087	0.087	0.087	JT	ug/L
			LW3-STW-CW30-WR4	0.087	0.087	0.087	JT	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
High Molecular Weight PAH								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.0054	0.0027	0	UT	ug/L
			LW3-STW-CW20-OF22C	0.0056	0.0028	0	UA	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.055	0.055	0.055	JT	ug/L
			LW3-STW-CW20-OF49	0.1	0.1	0.1	JT	ug/L
			LW3-STW-CW30-OF49	0.071	0.071	0.071	JT	ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	0.88	0.88	0.88	T	ug/L
			LW3-STW-CW20-H30	0.2	0.2	0.2	JT	ug/L
			LW3-STW-CW30-H30	0.32	0.32	0.32	JT	ug/L
		SJB	LW3-STW-CW10-SJB	8.1	8.1	8.1	T	ug/L
			LW3-STW-CW20-SJB	2.8	2.8	2.8	T	ug/L
			LW3-STW-CW30-SJB	1.7	1.7	1.7	JT	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	2.1	2.1	2.1	T	ug/L
			LW3-STW-CW20-OF18	0.64	0.64	0.64	T	ug/L
			LW3-STW-CW30-OF18	0.36	0.36	0.36	JT	ug/L
		OF19	LW3-STW-CW10-OF19	0.65	0.65	0.65	T	ug/L
			LW3-STW-CW20-OF19	0.95	0.95	0.95	T	ug/L
			LW3-STW-CW30-OF19	0.83	0.83	0.83	JT	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	0.89	0.89	0.89	T	ug/L
			LW3-STW-CW20-OFM1	1.2	1.2	1.2	T	ug/L
			LW3-STW-CW30-OFM1	1.2	1.2	1.2	T	ug/L
		OFM2	LW3-STW-CW10-OFM2	0.38	0.38	0.38	JT	ug/L
			LW3-STW-CW20-OFM2	0.68	0.68	0.68	T	ug/L
			LW3-STW-CW30-OFM2	0.21	0.21	0.21	JT	ug/L
			LW3-STW-CW40-OFM2	0.24	0.24	0.24	JT	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	0.69	0.69	0.69	T	ug/L
			LW3-STW-CW20-OF16	0.78	0.78	0.78	JT	ug/L
			LW3-STW-CW30-OF16	0.28	0.28	0.28	JT	ug/L
		OF22	LW3-STW-CW10-OF22	1.1	1.1	1.1	T	ug/L
			LW3-STW-CW20-OF22	0.65	0.65	0.65	T	ug/L
			LW3-STW-CW30-OF22	0.48	0.48	0.48	JT	ug/L
		OF22B	LW3-STW-CW10-OF22B	0.64	0.64	0.64	JT	ug/L
			LW3-STW-CW20-OF22B	1.5	1.5	1.5	T	ug/L
		WR218	LW3-STW-CW10-WR218	0.38	0.38	0.38	JT	ug/L
			LW3-STW-CW20-WR218	0.35	0.35	0.35	JT	ug/L
		WR67	LW3-STW-CW10-WR67	0.6	0.6	0.6	JT	ug/L
			LW3-STW-CW20-WR67	0.43	0.43	0.43	JT	ug/L
			LW3-STW-CW30-WR67	0.86	0.86	0.86	JT	ug/L
			LW3-STW-CW60-WR67	0.24	0.24	0.24	JT	ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	0.054	0.054	0.054	JT	ug/L
			LW3-STW-CW20-WR96	0.038	0.038	0.038	JA	ug/L
			LW3-STW-CW30-WR96	0.045	0.045	0.045	JT	ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	8.1	8.1	8.1	T	ug/L
			LW3-STW-CW20-WR14	4.7	4.7	4.7	T	ug/L
			LW3-STW-CW30-WR14	1.2	1.2	1.2	JT	ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	1.8	1.8	1.8	T	ug/L
			LW3-STW-CW20-WR107	3	3	3	T	ug/L
			LW3-STW-CW30-WR107	5.1	5.1	5.1	T	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.51	0.51	0.51	JT	ug/L
		WR145	LW3-STW-CW10-WR145	0.7	0.7	0.7	JT	ug/L
		WR147	LW3-STW-CW10-WR147	0.36	0.36	0.36	JT	ug/L
			LW3-STW-CW20-WR147	0.36	0.36	0.36	JT	ug/L
			LW3-STW-CW30-WR147	0.13	0.13	0.13	JT	ug/L
	OSM	WR22	LW3-STW-CW10-WR22	0.83	0.83	0.83	JT	ug/L
			LW3-STW-CW20-WR22	0.77	0.77	0.77	JT	ug/L
			LW3-STW-CW30-WR22	0.29	0.29	0.29	JT	ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	0.53	0.53	0.53	JT	ug/L
			LW3-STW-CW20-WR161	0.57	0.57	0.57	JT	ug/L
			LW3-STW-CW30-WR161	0.26	0.26	0.26	JT	ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	0.35	0.35	0.35	JT	ug/L
			LW3-STW-CW20-WR384	11	11	11	JT	ug/L
			LW3-STW-CW30-WR384	29	29	29	JT	ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	1.4	1.4	1.4	T	ug/L
			LW3-STW-CW20-WR123	0.98	0.98	0.98	JT	ug/L
			LW3-STW-CW30-WR123	0.37	0.37	0.37	JT	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.12	0.12	0.12	JT	ug/L
			LW3-STW-CW20-WR4	0.056	0.056	0.056	JT	ug/L
			LW3-STW-CW30-WR4	0.31	0.31	0.31	JT	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total PAHs								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.017	0.0085	0	UT	ug/L
			LW3-STW-CW20-OF22C	0.015	0.0075	0	UA	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.074	0.074	0.074	JT	ug/L
			LW3-STW-CW20-OF49	0.1	0.1	0.1	JT	ug/L
			LW3-STW-CW30-OF49	0.092	0.092	0.092	JT	ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	1	1	1	JT	ug/L
			LW3-STW-CW20-H30	0.28	0.28	0.28	JT	ug/L
			LW3-STW-CW30-H30	0.39	0.39	0.39	JT	ug/L
		SJB	LW3-STW-CW10-SJB	12	12	12	T	ug/L
			LW3-STW-CW20-SJB	3.5	3.5	3.5	T	ug/L
			LW3-STW-CW30-SJB	2.3	2.3	2.3	JT	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	2.6	2.6	2.6	JT	ug/L
			LW3-STW-CW20-OF18	0.72	0.72	0.72	JT	ug/L
			LW3-STW-CW30-OF18	0.43	0.43	0.43	JT	ug/L
		OF19	LW3-STW-CW10-OF19	0.75	0.75	0.75	JT	ug/L
			LW3-STW-CW20-OF19	1.1	1.1	1.1	JT	ug/L
			LW3-STW-CW30-OF19	0.98	0.98	0.98	JT	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	1.1	1.1	1.1	JT	ug/L
			LW3-STW-CW20-OFM1	1.6	1.6	1.6	T	ug/L
			LW3-STW-CW30-OFM1	1.5	1.5	1.5	JT	ug/L
		OFM2	LW3-STW-CW10-OFM2	0.46	0.46	0.46	JT	ug/L
			LW3-STW-CW20-OFM2	0.8	0.8	0.8	JT	ug/L
			LW3-STW-CW30-OFM2	0.26	0.26	0.26	JT	ug/L
			LW3-STW-CW40-OFM2	0.32	0.32	0.32	JT	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	1	1	1	JT	ug/L
			LW3-STW-CW20-OF16	0.98	0.98	0.98	JT	ug/L
			LW3-STW-CW30-OF16	0.71	0.71	0.71	JT	ug/L
		OF22	LW3-STW-CW10-OF22	1.3	1.3	1.3	JT	ug/L
			LW3-STW-CW20-OF22	0.78	0.78	0.78	JT	ug/L
			LW3-STW-CW30-OF22	0.52	0.52	0.52	JT	ug/L
		OF22B	LW3-STW-CW10-OF22B	1.2	1.2	1.2	JT	ug/L
			LW3-STW-CW20-OF22B	2.1	2.1	2.1	JT	ug/L
		WR218	LW3-STW-CW10-WR218	0.52	0.52	0.52	JT	ug/L
			LW3-STW-CW20-WR218	0.44	0.44	0.44	JT	ug/L
		WR67	LW3-STW-CW10-WR67	0.7	0.7	0.7	JT	ug/L
			LW3-STW-CW20-WR67	0.5	0.5	0.5	JT	ug/L
			LW3-STW-CW30-WR67	1	1	1	JT	ug/L
			LW3-STW-CW60-WR67	0.31	0.31	0.31	JT	ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	0.072	0.072	0.072	JT	ug/L
			LW3-STW-CW20-WR96	0.048	0.048	0.048	JA	ug/L
			LW3-STW-CW30-WR96	0.052	0.052	0.052	JT	ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	8.8	8.8	8.8	JT	ug/L
			LW3-STW-CW20-WR14	5.1	5.1	5.1	JT	ug/L
			LW3-STW-CW30-WR14	1.4	1.4	1.4	JT	ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	2	2	2	JT	ug/L
			LW3-STW-CW20-WR107	3.4	3.4	3.4	JT	ug/L
			LW3-STW-CW30-WR107	5.6	5.6	5.6	T	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.69	0.69	0.69	JT	ug/L
		WR145	LW3-STW-CW10-WR145	0.9	0.9	0.9	JT	ug/L
		WR147	LW3-STW-CW10-WR147	0.58	0.58	0.58	JT	ug/L
			LW3-STW-CW20-WR147	0.56	0.56	0.56	JT	ug/L
			LW3-STW-CW30-WR147	0.22	0.22	0.22	JT	ug/L
	OSM	WR22	LW3-STW-CW10-WR22	1.5	1.5	1.5	JT	ug/L
			LW3-STW-CW20-WR22	1	1	1	JT	ug/L
			LW3-STW-CW30-WR22	0.42	0.42	0.42	JT	ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	0.71	0.71	0.71	JT	ug/L
			LW3-STW-CW20-WR161	0.79	0.79	0.79	JT	ug/L
			LW3-STW-CW30-WR161	0.47	0.47	0.47	JT	ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	0.35	0.35	0.35	JT	ug/L
			LW3-STW-CW20-WR384	12	12	12	JT	ug/L
			LW3-STW-CW30-WR384	30	30	30	JT	ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	1.7	1.7	1.7	JT	ug/L
			LW3-STW-CW20-WR123	1.6	1.6	1.6	JT	ug/L
			LW3-STW-CW30-WR123	0.44	0.44	0.44	JT	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.21	0.21	0.21	JT	ug/L
			LW3-STW-CW20-WR4	0.14	0.14	0.14	JT	ug/L
			LW3-STW-CW30-WR4	0.4	0.4	0.4	JT	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Arsenic								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.196	0.196	0.196		ug/L
			LW3-STW-CW20-OF22C	0.202	0.202	0.202		ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.291	0.291	0.291		ug/L
			LW3-STW-CW20-OF49	0.255	0.255	0.255		ug/L
			LW3-STW-CW30-OF49	0.47	0.47	0.47		ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	0.49	0.49	0.49		ug/L
			LW3-STW-CW20-H30	0.531	0.531	0.531		ug/L
			LW3-STW-CW30-H30	0.49	0.49	0.49		ug/L
		SJB	LW3-STW-CW10-SJB	0.851	0.851	0.851		ug/L
			LW3-STW-CW20-SJB	0.868	0.868	0.868		ug/L
			LW3-STW-CW30-SJB	0.982	0.982	0.982		ug/L
			LW3-STW-CW50-SJB	0.823	0.823	0.823	J	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	1.67	1.67	1.67		ug/L
			LW3-STW-CW20-OF18	1.84	1.84	1.84		ug/L
			LW3-STW-CW30-OF18	1.78	1.78	1.78		ug/L
			LW3-STW-CW40-OF18	1.44	1.44	1.44		ug/L
		OF19	LW3-STW-CW10-OF19	0.774	0.774	0.774		ug/L
			LW3-STW-CW20-OF19	1.15	1.15	1.15		ug/L
			LW3-STW-CW30-OF19	2.02	2.02	2.02		ug/L
			LW3-STW-CW50-OF19	2.2	2.2	2.2	J	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	0.717	0.717	0.717		ug/L
			LW3-STW-CW20-OFM1	0.979	0.979	0.979		ug/L
			LW3-STW-CW30-OFM1	0.903	0.903	0.903		ug/L
			LW3-STW-CW40-OFM1	1.12	1.12	1.12		ug/L
		OFM2	LW3-STW-CW10-OFM2	2.27	2.27	2.27		ug/L
			LW3-STW-CW20-OFM2	0.99	0.99	0.99		ug/L
			LW3-STW-CW30-OFM2	1.22	1.22	1.22		ug/L
			LW3-STW-CW40-OFM2	1.85	1.85	1.85	J	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	0.512	0.512	0.512		ug/L
			LW3-STW-CW20-OF16	0.786	0.786	0.786		ug/L
			LW3-STW-CW30-OF16	0.338	0.338	0.338		ug/L
			LW3-STW-CW40-OF16	0.78	0.78	0.78		ug/L
			LW3-STW-CW50-OF16	0.71	0.71	0.71		ug/L
		OF22	LW3-STW-CW10-OF22	3.57	3.57	3.57		ug/L
			LW3-STW-CW20-OF22	2.42	2.42	2.42	J	ug/L
			LW3-STW-CW30-OF22	3.95	3.95	3.95		ug/L
		OF22B	LW3-STW-CW10-OF22B	4.02	4.02	4.02		ug/L
			LW3-STW-CW20-OF22B	5.84	5.84	5.84		ug/L
		WR218	LW3-STW-CW10-WR218	1.34	1.34	1.34		ug/L
			LW3-STW-CW20-WR218	0.94	0.94	0.94		ug/L
		WR67	LW3-STW-CW10-WR67	0.225	0.225	0.225		ug/L
			LW3-STW-CW20-WR67	0.134	0.134	0.134		ug/L
			LW3-STW-CW30-WR67	0.408	0.408	0.408		ug/L
			LW3-STW-CW50-WR67	0.594	0.594	0.594	J	ug/L
			LW3-STW-CW60-WR67	0.2	0.2	0.2		ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	19.8	19.8	19.8		ug/L
			LW3-STW-CW20-WR96	17.5	17.5	17.5		ug/L
			LW3-STW-CW30-WR96	17.5	17.5	17.5		ug/L
			LW3-STW-CW40-WR96	16.9	16.9	16.9		ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	0.706	0.706	0.706		ug/L
			LW3-STW-CW20-WR14	0.48	0.48	0.48		ug/L
			LW3-STW-CW30-WR14	0.271	0.271	0.271		ug/L
			LW3-STW-CW40-WR14	0.544	0.544	0.544		ug/L
			LW3-STW-CW50-WR14	0.54	0.54	0.54		ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	0.271	0.271	0.271		ug/L
			LW3-STW-CW20-WR107	0.817	0.817	0.817		ug/L
			LW3-STW-CW30-WR107	0.631	0.631	0.631		ug/L
			LW3-STW-CW40-WR107	1.32	1.32	1.32	J	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.87	0.87	0.87		ug/L
		WR145	LW3-STW-CW10-WR145	0.007	0.0035	0	U	ug/L
		WR147	LW3-STW-CW10-WR147	0.628	0.628	0.628		ug/L
			LW3-STW-CW20-WR147	1.07	1.07	1.07		ug/L
			LW3-STW-CW30-WR147	0.378	0.378	0.378		ug/L
			LW3-STW-CW40-WR147	0.931	0.931	0.931	J	ug/L
			LW3-STW-CW50-WR147	0.41	0.41	0.41		ug/L
	OSM	WR22	LW3-STW-CW10-WR22	4.16	4.16	4.16		ug/L
			LW3-STW-CW20-WR22	8.02	8.02	8.02		ug/L
			LW3-STW-CW30-WR22	5.77	5.77	5.77		ug/L
			LW3-STW-CW40-WR22	8.39	8.39	8.39		ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	1.62	1.62	1.62		ug/L
			LW3-STW-CW20-WR161	1.82	1.82	1.82		ug/L
			LW3-STW-CW30-WR161	1.46	1.46	1.46	J	ug/L
			LW3-STW-CW40-WR161	1.1	1.1	1.1		ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	1.5	1.5	1.5		ug/L
			LW3-STW-CW20-WR384	2.29	2.29	2.29		ug/L
			LW3-STW-CW30-WR384	2.88	2.88	2.88		ug/L
			LW3-STW-CW40-WR384	1.49	1.49	1.49		ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	14.3	14.3	14.3		ug/L
			LW3-STW-CW20-WR123	4.22	4.22	4.22		ug/L
			LW3-STW-CW30-WR123	2.74	2.74	2.74		ug/L
			LW3-STW-CW40-WR123	11.7	11.7	11.7	J	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.244	0.244	0.244		ug/L
			LW3-STW-CW20-WR4	0.21	0.21	0.21		ug/L
			LW3-STW-CW30-WR4	0.298	0.298	0.298		ug/L
			LW3-STW-CW40-WR4	0.422	0.422	0.422	J	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Lead								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.437	0.437	0.437		ug/L
			LW3-STW-CW20-OF22C	0.403	0.403	0.403	J	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	1.39	1.39	1.39		ug/L
			LW3-STW-CW20-OF49	2.75	2.75	2.75	J	ug/L
			LW3-STW-CW30-OF49	4.3	4.3	4.3		ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	7.12	7.12	7.12		ug/L
			LW3-STW-CW20-H30	13.2	13.2	13.2		ug/L
			LW3-STW-CW30-H30	5.41	5.41	5.41		ug/L
		SJB	LW3-STW-CW10-SJB	34.2	34.2	34.2		ug/L
			LW3-STW-CW20-SJB	25.8	25.8	25.8		ug/L
			LW3-STW-CW30-SJB	75.2	75.2	75.2	J	ug/L
			LW3-STW-CW50-SJB	23.2	23.2	23.2		ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	76.3	76.3	76.3		ug/L
			LW3-STW-CW20-OF18	24.4	24.4	24.4		ug/L
			LW3-STW-CW30-OF18	23.2	23.2	23.2		ug/L
			LW3-STW-CW40-OF18	54.2	54.2	54.2		ug/L
		OF19	LW3-STW-CW10-OF19	11.8	11.8	11.8		ug/L
			LW3-STW-CW20-OF19	10.4	10.4	10.4		ug/L
			LW3-STW-CW30-OF19	24	24	24	J	ug/L
			LW3-STW-CW50-OF19	41	41	41		ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	5.28	5.28	5.28		ug/L
			LW3-STW-CW20-OFM1	4.17	4.17	4.17		ug/L
			LW3-STW-CW30-OFM1	21.4	21.4	21.4	J	ug/L
			LW3-STW-CW40-OFM1	4.25	4.25	4.25		ug/L
		OFM2	LW3-STW-CW10-OFM2	2.85	2.85	2.85		ug/L
			LW3-STW-CW20-OFM2	3.54	3.54	3.54		ug/L
			LW3-STW-CW30-OFM2	4.04	4.04	4.04	J	ug/L
			LW3-STW-CW40-OFM2	8.39	8.39	8.39		ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	21.6	21.6	21.6		ug/L
			LW3-STW-CW20-OF16	39.1	39.1	39.1	J	ug/L
			LW3-STW-CW30-OF16	13.4	13.4	13.4	J	ug/L
			LW3-STW-CW40-OF16	55.4	55.4	55.4		ug/L
			LW3-STW-CW50-OF16	22.4	22.4	22.4		ug/L
		OF22	LW3-STW-CW10-OF22	14.7	14.7	14.7		ug/L
			LW3-STW-CW20-OF22	24.7	24.7	24.7		ug/L
			LW3-STW-CW30-OF22	9.73	9.73	9.73		ug/L
		OF22B	LW3-STW-CW10-OF22B	101	101	101		ug/L
			LW3-STW-CW20-OF22B	195	195	195		ug/L
		WR218	LW3-STW-CW10-WR218	19.5	19.5	19.5		ug/L
			LW3-STW-CW20-WR218	5.67	5.67	5.67		ug/L
		WR67	LW3-STW-CW10-WR67	1.67	1.67	1.67		ug/L
			LW3-STW-CW20-WR67	1.27	1.27	1.27		ug/L
			LW3-STW-CW30-WR67	4.25	4.25	4.25	J	ug/L
			LW3-STW-CW50-WR67	9.27	9.27	9.27		ug/L
			LW3-STW-CW60-WR67	0.616	0.616	0.616		ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	8.47	8.47	8.47		ug/L
			LW3-STW-CW20-WR96	12.4	12.4	12.4	J	ug/L
			LW3-STW-CW30-WR96	15.3	15.3	15.3		ug/L
			LW3-STW-CW40-WR96	14.6	14.6	14.6		ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	7.99	7.99	7.99		ug/L
			LW3-STW-CW20-WR14	6.11	6.11	6.11		ug/L
			LW3-STW-CW30-WR14	2.55	2.55	2.55	J	ug/L
			LW3-STW-CW40-WR14	11.4	11.4	11.4		ug/L
			LW3-STW-CW50-WR14	6.7	6.7	6.7		ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	2.79	2.79	2.79		ug/L
			LW3-STW-CW20-WR107	4.66	4.66	4.66		ug/L
			LW3-STW-CW30-WR107	7.8	7.8	7.8	J	ug/L
			LW3-STW-CW40-WR107	4.35	4.35	4.35		ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	1.16	1.16	1.16		ug/L
		WR145	LW3-STW-CW10-WR145	7.01	7.01	7.01		ug/L
		WR147	LW3-STW-CW10-WR147	34.8	34.8	34.8		ug/L
			LW3-STW-CW20-WR147	98.7	98.7	98.7		ug/L
			LW3-STW-CW30-WR147	25.5	25.5	25.5	J	ug/L
			LW3-STW-CW40-WR147	143	143	143		ug/L
			LW3-STW-CW50-WR147	14.6	14.6	14.6		ug/L
	OSM	WR22	LW3-STW-CW10-WR22	56.1	56.1	56.1		ug/L
			LW3-STW-CW20-WR22	42	42	42		ug/L
			LW3-STW-CW30-WR22	39.1	39.1	39.1	J	ug/L
			LW3-STW-CW40-WR22	56	56	56		ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	17.5	17.5	17.5		ug/L
			LW3-STW-CW20-WR161	11.4	11.4	11.4		ug/L
			LW3-STW-CW30-WR161	70	70	70		ug/L
			LW3-STW-CW40-WR161	12.1	12.1	12.1		ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	6.22	6.22	6.22		ug/L
			LW3-STW-CW20-WR384	580	580	580	J	ug/L
			LW3-STW-CW30-WR384	635	635	635	J	ug/L
			LW3-STW-CW40-WR384	285	285	285		ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	23.9	23.9	23.9		ug/L
			LW3-STW-CW20-WR123	71.8	71.8	71.8	J	ug/L
			LW3-STW-CW30-WR123	17.7	17.7	17.7	J	ug/L
			LW3-STW-CW40-WR123	53.3	53.3	53.3		ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	3.36	3.36	3.36		ug/L
			LW3-STW-CW20-WR4	1.89	1.89	1.89		ug/L
			LW3-STW-CW30-WR4	6.78	6.78	6.78		ug/L
			LW3-STW-CW40-WR4	13	13	13		ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Mercury								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.03	0.015	0	UJ	ug/L
			LW3-STW-CW20-OF22C	0.03	0.015	0	U	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.03	0.015	0	U	ug/L
			LW3-STW-CW20-OF49	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-OF49	0.03	0.015	0	U	ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	0.03	0.03	0.03	J	ug/L
			LW3-STW-CW20-H30	0.06	0.03	0	U	ug/L
			LW3-STW-CW30-H30	0.03	0.015	0	U	ug/L
		SJB	LW3-STW-CW10-SJB	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-SJB	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-SJB	0.06	0.06	0.06	J	ug/L
			LW3-STW-CW50-SJB	0.07	0.035	0	U	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	0.02	0.02	0.02	J	ug/L
			LW3-STW-CW20-OF18	0.04	0.04	0.04	J	ug/L
			LW3-STW-CW30-OF18	0.04	0.04	0.04	J	ug/L
			LW3-STW-CW40-OF18	0.08	0.04	0	U	ug/L
		OF19	LW3-STW-CW10-OF19	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-OF19	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-OF19	0.03	0.015	0	U	ug/L
			LW3-STW-CW50-OF19	0.09	0.045	0	U	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-OFM1	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-OFM1	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-OFM1	0.03	0.015	0	U	ug/L
		OFM2	LW3-STW-CW10-OFM2	0.03	0.015	0	U	ug/L
			LW3-STW-CW20-OFM2	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-OFM2	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-OFM2	0.06	0.03	0	U	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	0.04	0.04	0.04	J	ug/L
			LW3-STW-CW20-OF16	0.04	0.04	0.04	J	ug/L
			LW3-STW-CW30-OF16	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-OF16	0.09	0.045	0	U	ug/L
			LW3-STW-CW50-OF16	0.05	0.025	0	U	ug/L
		OF22	LW3-STW-CW10-OF22	0.04	0.04	0.04	J	ug/L
			LW3-STW-CW20-OF22	0.08	0.04	0	U	ug/L
			LW3-STW-CW30-OF22	0.03	0.015	0	U	ug/L
		OF22B	LW3-STW-CW10-OF22B	0.21	0.21	0.21		ug/L
			LW3-STW-CW20-OF22B	0.89	0.89	0.89		ug/L
		WR218	LW3-STW-CW10-WR218	0.06	0.03	0	U	ug/L
			LW3-STW-CW20-WR218	0.03	0.015	0	UJ	ug/L
		WR67	LW3-STW-CW10-WR67	0.03	0.015	0	UJ	ug/L
			LW3-STW-CW20-WR67	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-WR67	0.03	0.015	0	U	ug/L
			LW3-STW-CW50-WR67	0.05	0.025	0	U	ug/L
			LW3-STW-CW60-WR67	0.03	0.015	0	U	ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	0.19	0.19	0.19	J	ug/L
			LW3-STW-CW20-WR96	0.24	0.24	0.24		ug/L
			LW3-STW-CW30-WR96	0.45	0.225	0	U	ug/L
			LW3-STW-CW40-WR96	0.36	0.36	0.36		ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-WR14	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-WR14	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-WR14	0.06	0.03	0	U	ug/L
			LW3-STW-CW50-WR14	0.03	0.015	0	U	ug/L
	GASCO	WR107	LW3-STW-CW10-WR107	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-WR107	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-WR107	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-WR107	0.04	0.02	0	U	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.03	0.015	0	UJ	ug/L
		WR145	LW3-STW-CW10-WR145	0.03	0.015	0	U	ug/L
		WR147	LW3-STW-CW10-WR147	0.03	0.015	0	U	ug/L
			LW3-STW-CW20-WR147	0.07	0.07	0.07	J	ug/L
			LW3-STW-CW30-WR147	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-WR147	0.17	0.085	0	U	ug/L
			LW3-STW-CW50-WR147	0.03	0.015	0	U	ug/L
	OSM	WR22	LW3-STW-CW10-WR22	0.1	0.1	0.1	J	ug/L
			LW3-STW-CW20-WR22	0.1	0.1	0.1	J	ug/L
			LW3-STW-CW30-WR22	0.05	0.05	0.05	J	ug/L
			LW3-STW-CW40-WR22	0.17	0.085	0	U	ug/L
	Portland Shipyard	WR161	LW3-STW-CW10-WR161	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-WR161	0.03	0.03	0.03	J	ug/L
			LW3-STW-CW30-WR161	0.08	0.04	0	U	ug/L
			LW3-STW-CW40-WR161	0.03	0.015	0	U	ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	0.08	0.08	0.08	J	ug/L
			LW3-STW-CW20-WR384	1.79	1.79	1.79		ug/L
			LW3-STW-CW30-WR384	1.02	1.02	1.02		ug/L
			LW3-STW-CW40-WR384	0.59	0.59	0.59		ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	0.03	0.015	0	U	ug/L
			LW3-STW-CW20-WR123	0.08	0.08	0.08	J	ug/L
			LW3-STW-CW30-WR123	0.03	0.015	0	U	ug/L
			LW3-STW-CW40-WR123	0.11	0.055	0	U	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.02	0.01	0	UJ	ug/L
			LW3-STW-CW20-WR4	0.03	0.015	0	U	ug/L
			LW3-STW-CW30-WR4	0.03	0.015	0	UJ	ug/L
			LW3-STW-CW40-WR4	0.05	0.025	0	U	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
2,4-D								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.034	0.017	0	U	ug/L
			LW3-STW-CW20-OF22C	0.036	0.018	0	U	ug/L
	Residential	OF49	LW3-STW-CW10-OF49	0.34	0.34	0.34	J	ug/L
			LW3-STW-CW20-OF49	2	2	2		ug/L
	Major Transportation	H30	LW3-STW-CW10-H30	0.22	0.22	0.22	J	ug/L
			LW3-STW-CW20-H30	0.39	0.195	0	U	ug/L
		SJB	LW3-STW-CW40-SJB	0.42	0.21	0	U	ug/L
			LW3-STW-CW50-SJB	0.36	0.18	0	U	ug/L
			LW3-STW-CW60-SJB	1.1	1.1	1.1	J	ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	0.034	0.017	0	U	ug/L
			LW3-STW-CW20-OF18	0.097	0.097	0.097	NJ	ug/L
			LW3-STW-CW30-OF18	0.067	0.067	0.067	J	ug/L
		OF19	LW3-STW-CW10-OF19	0.15	0.15	0.15	NJ	ug/L
			LW3-STW-CW20-OF19	0.14	0.07	0	U	ug/L
			LW3-STW-CW30-OF19	0.081	0.081	0.081	J	ug/L
			LW3-STW-CW40-OF19	0.057	0.057	0.057	NJ	ug/L
	Light Industrial	OFM1	LW3-STW-CW10-OFM1	0.19	0.19	0.19	J	ug/L
			LW3-STW-CW20-OFM1	0.11	0.11	0.11	NJ	ug/L
			LW3-STW-CW30-OFM1	0.034	0.017	0	U	ug/L
		OFM2	LW3-STW-CW10-OFM2	0.19	0.19	0.19	J	ug/L
			LW3-STW-CW30-OFM2	0.083	0.083	0.083	J	ug/L
			LW3-STW-CW40-OFM2	1.1	1.1	1.1	J	ug/L
	Heavy Industrial	OF16	LW3-STW-CW10-OF16	0.28	0.28	0.28	NJ	ug/L
			LW3-STW-CW20-OF16	0.64	0.64	0.64		ug/L
			LW3-STW-CW30-OF16	0.058	0.058	0.058	NJ	ug/L
		OF22	LW3-STW-CW10-OF22	0.036	0.018	0	U	ug/L
			LW3-STW-CW20-OF22	0.36	0.18	0	U	ug/L
			LW3-STW-CW30-OF22	0.94	0.94	0.94	J	ug/L
		OF22B	LW3-STW-CW10-OF22B	0.76	0.76	0.76		ug/L
			LW3-STW-CW20-OF22B	4.1	4.1	4.1	J	ug/L
		WR218	LW3-STW-CW10-WR218	16	16	16		ug/L
		WR67	LW3-STW-CW10-WR67	0.099	0.0495	0	U	ug/L
			LW3-STW-CW60-WR67	0.34	0.17	0	U	ug/L
	Arkema	WR96	LW3-STW-CW40-WR96	0.37	0.185	0	U	ug/L
	Chevron - Transportation	WR14	LW3-STW-CW10-WR14	0.036	0.018	0	U	ug/L
			LW3-STW-CW40-WR14	0.38	0.19	0	U	ug/L
			LW3-STW-CW50-WR14	0.37	0.185	0	U	ug/L
	GASCO	WR107	LW3-STW-CW20-WR107	0.036	0.018	0	U	ug/L
			LW3-STW-CW30-WR107	0.036	0.018	0	U	ug/L
			LW3-STW-CW40-WR107	2.3	1.15	0	U	ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.36	0.18	0	U	ug/L
		WR147	LW3-STW-CW40-WR147	0.36	0.18	0	U	ug/L
			LW3-STW-CW50-WR147	0.34	0.17	0	U	ug/L
	OSM	WR22	LW3-STW-CW10-WR22	0.036	0.018	0	U	ug/L
			LW3-STW-CW20-WR22	0.037	0.0185	0	U	ug/L
			LW3-STW-CW30-WR22	0.034	0.017	0	U	ug/L
	Portland Shipyard	WR161	LW3-STW-CW20-WR161	0.036	0.018	0	U	ug/L
			LW3-STW-CW30-WR161	0.37	0.185	0	U	ug/L
			LW3-STW-CW40-WR161	0.37	0.185	0	U	ug/L
	Schnitzer - Riverside	WR384	LW3-STW-CW10-WR384	0.64	0.64	0.64	NJ	ug/L
			LW3-STW-CW40-WR384	1.2	1.2	1.2	J	ug/L
			LW3-STW-CW50-WR384	1.2	1.2	1.2	J	ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW10-WR123	0.13	0.13	0.13	J	ug/L
			LW3-STW-CW40-WR123	0.34	0.17	0	U	ug/L
			LW3-STW-CW50-WR123	0.22	0.22	0.22	J	ug/L
	Sulzer Pump	WR4	LW3-STW-CW10-WR04	0.1	0.1	0.1	J	ug/L
			LW3-STW-CW20-WR4	0.11	0.11	0.11	NJ	ug/L
			LW3-STW-CW30-WR4	0.034	0.017	0	U	ug/L

Table: Compilation of Data Used in Summary Statistics and Scatterplots[a]

Analyte	Land Use Group	Outfall ID	SampleID	Non-Detects at Detection Limit Value	Non-Detects at 1/2 D.L. Value	Non-Detects at 0 Value	Qualifier	Units
Total Phthalates								
	Open Space (Forest Park)	OF22C	LW3-STW-CW10-OF22C	0.23	0.23	0.23		ug/L
			LW3-STW-CW20-OF22C	0.087	0.0435	0		ug/L
	Residential	OF49	LW3-STW-CW10-OF49	1.3	1.3	1.3		ug/L
			LW3-STW-CW20-OF49	2.7	2.7	2.7		ug/L
	Major Transportation	SJB	LW3-STW-CW20-SJB	21	21	21		ug/L
			LW3-STW-CW30-SJB	12	12	12		ug/L
			LW3-STW-CW40-SJB	3.2	3.2	3.2		ug/L
	Open Space/Heavy Ind.	OF18	LW3-STW-CW10-OF18	7.7	7.7	7.7		ug/L
			LW3-STW-CW20-OF18	5	5	5		ug/L
			LW3-STW-CW30-OF18	10	10	10		ug/L
	Light Industrial	OFM2	LW3-STW-CW10-OFM2	2.7	2.7	2.7		ug/L
			LW3-STW-CW20-OFM2	1.9	1.9	1.9		ug/L
			LW3-STW-CW30-OFM2	2.2	2.2	2.2		ug/L
			LW3-STW-CW40-OFM2	5.5	5.5	5.5		ug/L
	Arkema	WR96	LW3-STW-CW10-WR96	0.5	0.5	0.5		ug/L
			LW3-STW-CW30-WR96	0.59	0.59	0.59		ug/L
			LW3-STW-CW40-WR96	0.035	0.035	0.035		ug/L
	Gunderson	WR142	LW3-STW-CW10-WR142	0.48	0.48	0.48		ug/L
		WR147	LW3-STW-CW10-WR147	5.1	5.1	5.1		ug/L
			LW3-STW-CW20-WR147	2.1	2.1	2.1		ug/L
			LW3-STW-CW30-WR147	2.3	2.3	2.3		ug/L
	OSM	WR22	LW3-STW-CW10-WR22	2.4	2.4	2.4		ug/L
			LW3-STW-CW20-WR22	0.072	0.072	0.072		ug/L
			LW3-STW-CW30-WR22	1.6	1.6	1.6		ug/L
	Portland Shipyard	WR161	LW3-STW-CW20-WR161	2.8	2.8	2.8		ug/L
			LW3-STW-CW30-WR161	7.4	7.4	7.4		ug/L
			LW3-STW-CW40-WR161	1.3	1.3	1.3		ug/L
	Schnitzer International Slip	WR123	LW3-STW-CW30-WR123	2.4	2.4	2.4		ug/L
			LW3-STW-CW40-WR123	4.8	4.8	4.8		ug/L

[a] Note: Sample Duplicates are Excluded

October 12, 2007 Stormwater Technical Team Call October 16 at 1:00 pm

From: TARNOW Karen E [TARNOW.Karen@deq.state.or.us]
Sent: Tue 10/16/2007 9:29 AM
To: Koch.Kristine@epamail.epa.gov; Carl Stivers
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; MCCLINCY Matt; mcoover@ensr.aecom.com; LaFranchise, Nicole; Rick Applegate; Bob Wyatt
Subject: RE: Stormwater Technical Team Call October 16 at 1:00 pm

I asked AMEC about the status of stormwater sampling at GE. Here's what they said (the comments in CAPS are mine):

April 2007 sampling event - Storm water sample collected from North Yard discharge. Results have previously been reported to DEQ and EPA. [TOTAL PCBS FROM MH2 (LARGE BASIN) = 91,300 PG/L ON APRIL 12]

June 2007 sampling event - Storm water sample collected from south parking lot discharge. DEQ and EPA should have received the report documenting the results via Fed Ex today. [TOTAL PCBS FROM SV1 (SMALL
BASIN) = 1,340 TOTAL AND 4,610 DISSOLVED PG/L ON JUNE 10]

October 2007 - The annual maintenance on the Site's storm water system was completed on Thursday, October 11, 2007. The automated samplers were deployed on Friday, October 12, 2007 and have been programmed to collect samples during the next forecasted qualifying rain event later this week.

Two additional storm water samples are planned to be collected from each discharge point by the end of December 2007. This would make for a total of four samples collected from each discharge point, and would satisfy the storm water sampling portion of the approved work plan.

A catch basin solids sample will be collected from each catch basin when sufficient solids accumulate. No measurable sediment accumulation has been observed to date.

-----Original Message-----
From: Koch.Kristine@epamail.epa.gov
[mailto:Koch.Kristine@epamail.epa.gov]
Sent: Monday, October 15, 2007 7:07 PM
To: Carl Stivers
Cc: Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Christine Hawley; Sanders, Dawn; Gene Revelas; Jim McKenna; Jessica Pisano; Scheffler, Linda; Laura Jones; MCCLINCY Matt; mcoover@ensr.aecom.com; LaFranchise, Nicole; Rick Applegate; Bob Wyatt; TARNOW Karen E
Subject: RE: Stormwater Technical Team Call October 16 at 1:00 pm

Team - I have to be at home tomorrow - my cat has to have emergency surgery (for those interested, he has Intussusception). I will try to call in from home. Just thought I'd let you know in advance.

Kristine Koch
Remedial Project Manager
USEPA, Office of Environmental Cleanup

U. S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900, M/S ECL-115
Seattle, Washington 98101-3140

(206)553-6705
(206)553-0124 (fax)
1-800-424-4372 extension 6705 (M-F, 8-4 Pacific Time, only)

"Carl Stivers" <cstivers@anchorenv.com>
10/12/2007 10:02 AM

To: Kristine Koch/R10/USEPA/US@EPA, "Andy Koulermos" <akoulermos@newfields.com>, "Amanda Shellenberger" <ashellenberger@anchorenv.com>, "Amanda Spencer" <aspencer@ashcreekassociates.com>, "Sanders, Dawn" <DAWNS@BES.CI.PORTLAND.OR.US>, "Scheffler, Linda" <LindaSC@BES.CI.PORTLAND.OR.US>, "Laura Jones" <ljones@integral-corp.com>, <mcoover@ensr.aecom.com>, "LaFranchise, Nicole" <Nicole.LaFranchise@portofportland.com>, "TARNOW Karen E" <TARNOW.Karen@deq.state.or.us>

cc: "Bob Wyatt" <rjw@nwnatural.com>, "Rick Applegate" <RICKA@bes.ci.portland.or.us>, "MCCLINCY Matt" <MCCLINCY.Matt@deq.state.or.us>, "Jessica Pisano" <jpisano@anchorenv.com>, "Gene Revelas" <grevelas@integral-corp.com>, "Christine Hawley" <chawley@integral-corp.com>, "Jim

McKenna"
<Jim.McKenna@portofportland.com>
Subject
RE: Stormwater Technical Team
Call October 16 at 1:00 pm

Stormwater Technical Team -

<<Elements of Loading Analysis Oct 12.doc>>
<<20071010_summary_stats_tables_only.xls>>
<<20071011_figures_by_outfall.pdf>> <<20071012_figures_by_land_use.pdf>>

Attached are some data summaries to facilitate our next call. In addition, there is a summary of loading estimate calculation method options that was also requested by the team.

-Remaining text deleted-

October 16, 2007 Notes from Oct. 16 Stormwater Technical Team Meeting

From: Carl Stivers
Sent: Tue 10/16/2007 5:18 PM
To: 'Koch.Kristine@epamail.epa.gov'; 'Scheffler, Linda'; 'Amanda Spencer'; 'Andy Koulermos'; 'Laura Jones'; Amanda Shellenberger; 'Sanders, Dawn'; 'LaFranchise, Nicole'; 'TARNOW Karen E'
Cc: 'Christine Hawley'; 'Gene Revelas'; Jim McKenna; Jessica Pisano; Rick Applegate; Bob Wyatt; mcoover@ensr.aecom.com; MCCLINCY Matt; Jessica Pisano
Subject: Notes from Oct. 16 Stormwater Technical Team Meeting

Stormwater Technical Team –

Here are the highlights and action items from today's call. We decided that the next meeting (in person for most folks) will be on November 13th from 12:30 to 3 pm. A meeting location will be confirmed in a later email. The primary topic of discussion for this meeting will be the methods for loading calculations and estimates.

The primary topic of conversation for the Oct. 16 meeting was to finalize the data needs proposal. The attached table shows the data needs developed by the group. Note that there was disagreement on the need for sampling the T-4 site (WR-169) per the attached table, but the group agreed that we are requesting LWG discuss their position on sampling at this location in light of the Port's objections to this data need.

Note that the group also agreed that in general flow meters do not need to be deployed at sites where only sediment traps are being proposed. One exception, for WR-4, is noted in the attached table.

Please let me know ASAP if you have any objections or changes to this table before we provide it to the LWG Exec. for requested approval. I would like to send this to the LWG tomorrow if at all possible. Remember that any changes at this point need to be clear omissions or clarification based on the meeting discussions. Otherwise we would have to reconvene to discuss, which the current timeline does not allow.

Per the group's request, we are also working on an additional table that shows the fall/winter data collection ongoing or proposed for the T-4 and GE sites. This will come out in a later email.

It was agreed that the general path forward would be:

- Obtain official LWG approval/disapproval between Oct. 16 and October 31. Target date October 24.
- Assuming approval is provided, formalize proposal in a technical memo from Oct. 16 to October 31, with EPA approval to proceed on or about October 31. (Note that this memo would heavily reference the existing FSP and would only note those new items necessary to execute this additional proposed work.) After the meeting, I thought about this a little more, and I think the earliest that this FSP addendum would come to EPA for approval is November 1. So, we will be seeking EPA approval essentially as fast as possible.
- Deploy sediment traps from approximately Nov. 1 (depending on date of EPA approval) through Dec. 31

- Be on alert for storm events from approximately Nov. 1 (depending on data of EPA approval) through Dec. 31 and collect storms as possible per the FSP requirements.

Additional items and action items that were discussed:

- Per Merv's suggestion, Anchor will look into the ability to deploy twice the number (or possibly more) of sediment trap bottles at the fall sampling locations to improve sampling volumes.
- In addition to the general description of the fall sampling, the FSP addendum would describe only those items that differ from the existing FSP. Examples discussed include: prioritization changes of sediment trap analytes based on data available already as well as that flow meters will not be deployed at sediment trap only locations.
- Andy Koulermos will look into the status of the WR-169 sediment trap and stormwater sampling to see how this might impact the requested LWG discussion on potentially sampling for PCBs at this site.
- For the next meeting:
    - Anchor/Integral will assess the distributions of stormwater data (assess for normality) and will provide a summary of this to the team prior to the next meeting.
    - Anchor will sort through options provided in the previous stormwater loading options description and propose a reasonable specific approach to facilitate discussions next time.
    - Anchor/Integral will discuss what form we currently have T-4 data and determine whether we need it in some other form to start to integrate it into the overall stormwater database.
    - Anchor/Integral will also discuss a proposed path forward for integrating these data and will report back on a proposed plan at the next meeting.

Let me know if I missed anything. Thanks much.

Carl

Carl Stivers
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No.	Station	Stormwater Events	Sediment Trap	Rationale	Other Notes
1	OF-22C	1		Only one open space station, and it is currently not complete for stormwater	
2	Hwy 30	3	1	Location inadvertantly included industrial drainage--not applicable to transportation	
2a	Hwy 30"B"	3	1	St. Johns Bridge site was recently re-paved and painted and may not be representative of overall transportation type	Hwy 30 and Reed St. appears to be a reasonable site, but will require reconnaissance to confirm.
3	OF-22B	1	1	Could be unique site for pesticides or PCBs and missing a storm for both and pesticides in sediments	Prioritize sediment traps for missing analytes (starting with pesticides)
4	OF-49	1	1	Only two residential sites and this one missing a storm for some analytes and almost all sediment analytes	Need all analytes in sediments
5	OF-18		1	Only one of two multiple land use sites and missing metals in sediment	Prioritize sediment traps for missing analytes (starting with metals)
6	WR-145/142	2	1	Only 1 storm for PCBs and missing almost all sediment analytes	Need all analytes in sediments
7	WR-96	1	1	Missing one storm for PCBs and two for herbicides and sediment traps missing all analytes	
8	WR-14		1	Missing most analytes in sediment	Prioritize traps for missing analytes.
9	WR-4		1	Missing most analytes in sediment	Prioritize traps for missing analytes. Place flow meter at this site as well due to process water discharges present here.
10	WR-161		1	Missing most analytes in sediment	Prioritize traps for missing analytes.
11	WR-123		1	Missing most analytes in sediment	Prioritize traps for missing analytes.
12	WR-147		1	Missing most analytes in sediment	Prioritize traps for missing analytes.
13	WR-218	1	1	Could be unique site for some chemicals and missing a storm and most sediment analytes	Prioritize sediment traps for missing analytes
14	WR-169?	3	1	PCB congeners in stormwater and possibly also sediment traps missing for this site. Data needed to support light industrial land use loading estimates.	There is a gap between the expectations of the LWG FSP and the T-4 FSP. **The Port expressed a general objection to the need for these data points.** It was agreed the Port would discuss this potential data need with the wider LWG to see if any compromises could be reached. One potential way to resolve the sediment trap data need is if there is sufficient sample from the already deployed T-4 sediment trap, an aliquot for PCB congeners could be provided. Also, the Port's ability to do any stormwater sampling may be contingent upon whether the scheduled fall storm event
Totals		12	13		
Previous Totals		9	12		

Yellow highlights indicate cells that changed from the Sep. 18 version of this table.

October 17, 2007 Notes from Oct. 16 Stormwater Technical Team Meeting

From: Karen Tarnow
Sent: Wed 10/17/2007 10:48 AM
To: Carl Stivers
Subject: RE: Notes from Oct. 16 Stormwater Technical Team Meeting

Looks good Carl. In addition to adding Port data to the database (or whatever) you'll do the same with GE, right?

> -----Original Message-----
> From: Carl Stivers [mailto:cstivers@anchorenv.com]
> Sent: Tue 10/16/2007 5:18 PM
> To: Carl Stivers; Koch.Kristine@epamail.epa.gov; Andy Koulermos; Amanda Shellenberger; Amanda Spencer; Sanders, Dawn; Scheffler, Linda; Laura Jones; mcoover@ensr.aecom.com; LaFranchise, Nicole; TARNOW Karen E
> Cc: Bob Wyatt; Rick Applegate; MCCLINCY Matt; Jessica Pisano; Gene Revelas; Christine Hawley; Jim McKenna
> Subject: Notes from Oct. 16 Stormwater Technical Team Meeting